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OPHTHALMIC REVIEW,

A
MONTHLY RECORD
OF
OPHTHALMIC SCIENCE.

EDITED BY

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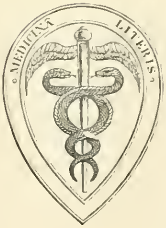

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FIG I.

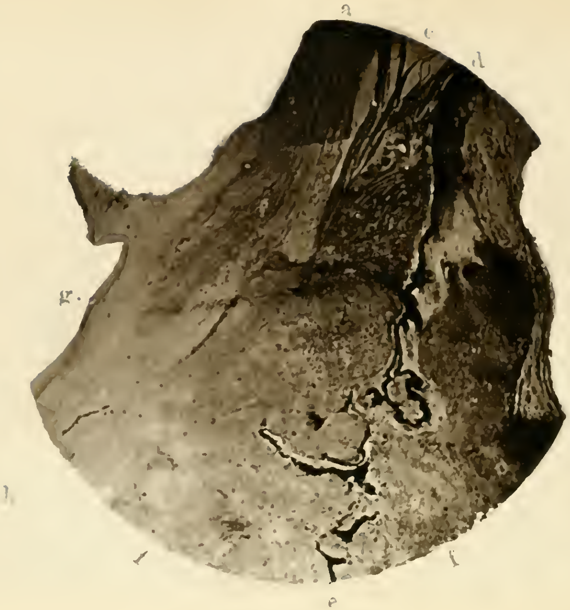
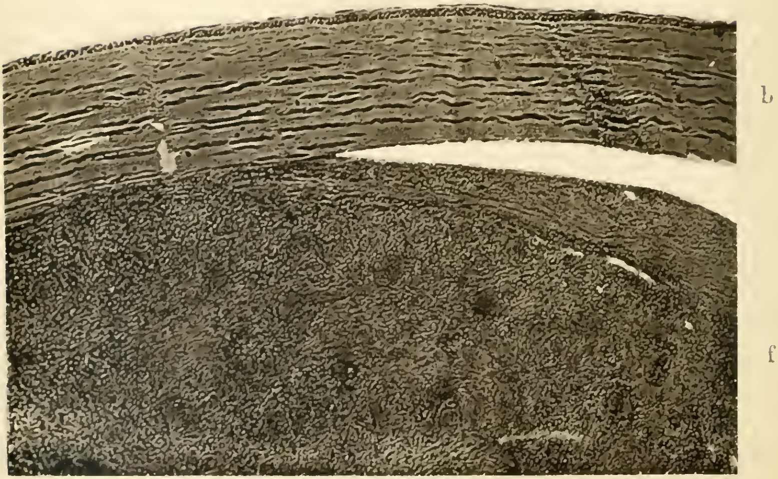


FIG. II.



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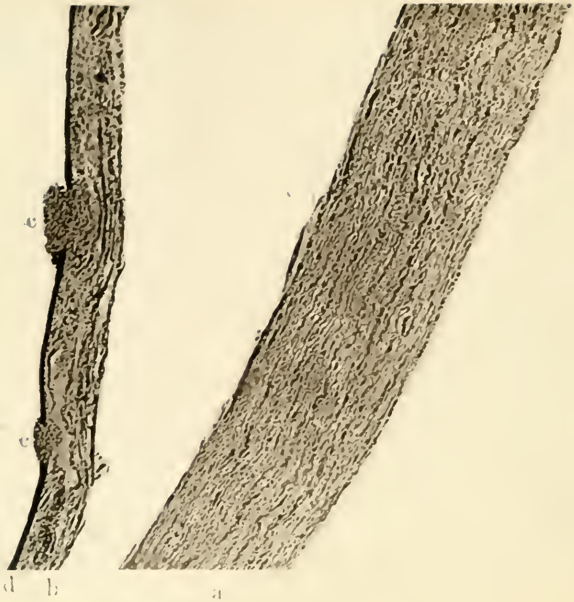

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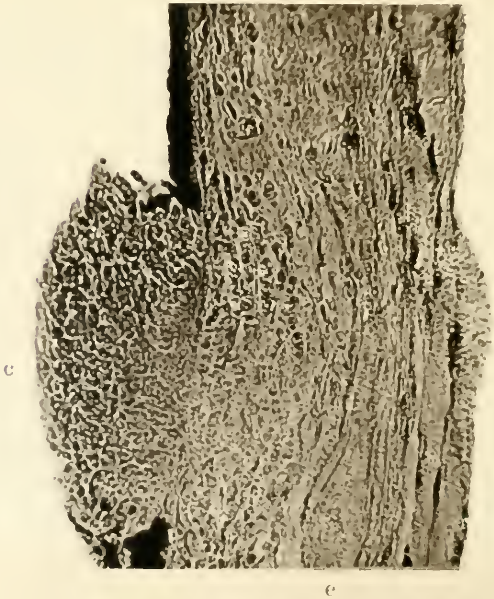

TUBERCLE OF THE EYE AND ITS APPENDAGES IN ITS RELATION TO GENERAL TUBERCULAR INFECTION.

By P. H. Mules, M.D.,

Surgeon to the Royal Eye Hospital, Manchester.

The light shed upon the nature of tubercle by Koch's methods of investigation, whilst clearing the ground of some difficulties formerly besetting it, has placed others in the way by narrowing down the origin of the disease to a source not always demonstrable. It is not my

---

Fig. I.

Section of anterior portion of tuberculous eyeball through infiltrated ciliary body.

a. Sclera.
b. Cornea.
c. Ciliary muscle.
d. Choroid to be traced downwards to *e*.
e. Ciliary processes imbedded in tubercle.
ff. Mass of tubercle.
g. Line of tuberculous extension into cornea and sclera by way of nutritive channels. Magnified 20 diameters.

Fig. II.

Continuation of section of Fig. I., showing tuberculous mass *f*. filling up anterior chamber impinging on but not infiltrating cornea *b*. Magnified 30 diameters.

For full particulars and minute anatomical details *vide* Ophthalmological Transactions, vol. ii., p. 26-5.

Fig. III.

A section of the choroid and sclera with tuberculous nodules projecting through the pigmented layer of the retina *d*, *a* choroid, *b* sclera, c.c. nodules of tubercle. Magnified 40 diameters.

Fig. IV.

A portion of same, magnified 120 diameters. Here the nodule *c* with its structure at the base and displacement of true choroidal elements is admirably shown.

e is a commencing choroidal tubercle deep in the structure of the choroid extending laterally before presenting through the retinal pigment layer.

Ophth. Review, Vol. IV. No. 39. January, 1885.

intention to discuss the origin of tubercle here ; I refer to it only to point out that the non-detection of the tubercle bacillus in supposed miliary tuberculosis need in nowise invalidate the accuracy of the diagnosis.

During the last few years attention has been specially directed to the *local origin of tubercle.* Recent ophthalmological literature contains many records of tuberculous affections of the eye and its appendages, but as a primary ocular development the disease is of such infrequent occurrence that during the past ten years we have recognised but three examples of it in Manchester—one in 33,000 cases. As an affection secondary to lung, or general tuberculosis, it is met with less rarely, though hardly with the frequency recorded by Cohnheim, who supposed himself to have found tubercles of the choroid, post mortem, in almost every case of chronic phthisis examined. During life visible tuberculous nodules in the choroid are sufficiently uncommon to neutralise much of their value as an aid to diagnosis.

My intention in this paper is to glance—

Firstly, at tubercle developed in and around the eye as a *primary pathological affection.*

Secondly, at the results of inoculation into the chambers of the eye *as an experimental and diagnostic study.*

And thirdly, at the development of intraocular tubercle *as a growth secondary to its outbreak in other organs of the body.*

McKenzie, of Glasgow, writing fifty years ago, described tuberculous disease of the eyeball and forecast a subsequent general infection, but his prophetic utterances passed unnoticed, for in Rokitansky's list* of 14,000 post-mortem examinations ocular tubercle finds no place. Manz† is credited with the honour of first substantiating the diagnosis microscopically in 1858, and we are told that Von Jaeger* three years previously had recognised tubercle ophthalmoscopically in the living eye, verifying the diagnosis subsequently to Manz by post-mortem examination. Whatever doubts may have arisen as to the nature of these growths at that time, we may now take it for granted that the existence of primary tuberculosis of the eyeball and its appendages, leading not infrequently to general miliary tuberculosis, has been abundantly proved, and that therein lies the importance of an early and accurate diagnosis.

---

* Wolfe, Brit. Med. Jour., 1882.

† Archiv. für Opth., IV., 2, p. 120, 1858.

Primary tuberculosis, according to Haab, who has collected eleven cases, attacks the tunics of the eye and its appendages in the following proportion :—Palpebral conjunctiva (lid), six times ; iris, four times ; bulbar conjunctiva and choroid, once. I have myself seen four cases ; the iris was attacked in three, the conjunctiva in one ; in one case the cornea, choroid, and retina were also implicated. The age at which primary tubercle invades the eye is uncertain, the earliest recorded instance being one of conjunctival tuberculosis in a child of 8 months attending Del Monte's Clinique at Naples.†

Primary Tubercle of the Palpebral Conjunctiva is a rare affection, and with the exception of a few isolated cases scattered throughout ophthalmic literature detailed mention is made of it only in Horner's work on "Diseases of the Eye in Childhood." He writes, "It is a manifestation of a coexistent and similar affection of the lymphatic system of the same side, and is generally found upon the conjunctiva of the lid, rarely of the globe ; the lid appears thickened ; the conjunctiva is converted into a greyish red mucous mass, granulating and discharging a yellowish secretion. The disease always lasts a long time ; decay slowly proceeds while new granulations spring up ;

---

* Osterreich Zeitschrift für pract Heilkunde, No. 2, 26 Jan., 1855. For Manz and Jaeger *vide* Wecker and Jaeger Atlas, p. 190.

† Collica Accordino, C. f. A., vol. viii., p. 315.

marginal ulcers and pannus of the cornea may finally develop. The prognosis is not always bad; sometimes the disease disappears, leaving but a few scars. Such was the exact condition in a boy, aged 4 years, who came under my care in March of the year 1882, the child of healthy parents of middle rank; eight brothers and sisters all living; his hygienic surroundings exceptionally favourable. The lymphatics of the same side were enlarged and eventually suppurated, after which the case progressed to perfect recovery. The treatment from the commencement was directed to the child's defective nutrition and extended over eight months.

Tuberculous disease of the conjunctiva of the globe is of still rarer occurrence. Hirschberg brought forward the only instance with which I am acquainted, at the International Congress held in London in 1881. The patient, a girl, aged 4, of healthy parentage, was seen July 18, 1878; right eye normal; left, neither pain, discharge, nor distress, but the globar conjunctiva surrounding the cornea entirely converted into a confluent caseous ulcer; enormous submaxillary glands. The cornea became involved, pain was set up, and Hirschberg excised the eyeball. Two months later the enlarged glands had entirely disappeared and the child recovered rapidly, being quite well 2½ years afterwards. Sections of the growth (typical tubercle) were shown at the Congress.

The Lachrymal Gland, too, is credited with being the seat of primary tubercle. Abadie records it[*] under the head of "rare symmetrical tumours of the eyelids." The interest of this case, apart from its special character, centres in the fact that at first one growth only was removed and independently examined by two competent pathologists, M. Debove and M. Brissaud, who declared it to be undoubted tubercle. The second growth was left until the deformity obliged its removal, and the patient suffered from some chest complication. It was then excised, the excision was followed by amelioration of the chest trouble, and finally, under appropriate treatment, perfect recovery. The patient was a female, aged 16 years.

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[*] Archives d'Opthalmologie, 1880, p. 432.

We may close our list of extraocular manifestations of tubercle by mentioning a case of Sattler's, "tubercle involving the *optic nerve and sheath*," which apparently proved fatal, but whether by inducing meningitis or general tuberculosis does not appear. We may pass over the causes of defective vision, whether neuritic or circulatory, due to tuberculous masses in the brain, as not lying within the limits of this paper.

Primary tuberculous deposits within the eye.—Of the tissues here attacked, my own experience, confirmed by the observations of Cohnheim and Haab mentioned before, leads me to select the *iris* as most frequently the starting point of tubercle; thence the disease spreads to the other tunics with more or less rapidity. Opposed to this, Falchi reported in 1882 that in a number of experiments on rabbits with human and bovine tubercle the iris possessed seven days longer resisting power than either the cornea, sclera, or retina. I have before me a mounted specimen of tubercle of the iris from a case of Dr. Glascott's, and also a section of the whole front of the eye from an almost identical one of my own. Of two examples occurring in my own practice and noted carefully from the commencement, the early conditions were identical: the children irritable and restless, vision very defective if not lost; the cornea cloudy in patches; the iris immobile, with greyish, translucent, nonvascularised masses lying upon it; the edge of the pupil glued to the capsule of the lens. Removal of the globe in one case was followed by recovery, the disease having apparently localised itself within the eye. I am still watching the other.

The accompanying microphotographs are from sections of a tuberculous eyeball.

Recurring to my statement that the non-detection of tubercle bacilli does not invalidate the diagnosis, I may say in this case every known staining was tried with a negative result. I have also a drawing of miliary tubercles of the choroid in which the same absence of bacilli was a marked feature.[*] I am not alone in my failures, for Hosch, S. McKenzie, and others have hitherto been unable to demonstrate tubercle bacilli within the eye. We cannot over-estimate the importance of this negative evidence, for it either strikes at the root of Koch's inferences, or it establishes the fact that chronic phthisis and miliary tuberculosis are different diseases, but it requires further investigation.

Tuberculous infiltration of the choroid, not miliary, is very rare. Gowers records one case,[†] and Hirschberg another.[‡] The latter occurred in a man, aged 27, suffering from fever and headache attributed by Hirschberg to orbital abscess; the choroid seen ophthalmoscopically shewed a white deposit not in small detached points but in mass. The patient died of tubercular meningitis, and, the eye being examined, the choroid was found to be the seat of extensive tuberculous infiltration.

Influence of Heredity.—Although in my cases there was no hereditary influence to determine an outbreak of tubercle in the eye, yet we may fairly assume that a child born of tuberculous parents is more likely to develop the disease than the offspring of healthy ones. Swanzy[§] relates such a case, with tubercle on both sides; and Swann Burnet[‖] records an example in which he traced the following family history:—The child, a mulatto, who eventually died of general tuberculosis, was 13 years of age; she was the eighth of the family who had died of tubercle, and her father and several of his family succumbed to the same scourge. This being so, it becomes of paramount importance to diagnose early and with accuracy the existence of tubercle. Will the microscope do it? Not always. If we could find a distinctive bacillus, our diagnosis would lack nothing in completeness, but it is just in these cases of acute tubercle that a bacillus cannot be found, so we are fain to fall back upon giant cells and caseation. But giant cells are found in syphilitic gummata, in lupus, and even in granulation tissue, whilst caseation is not constant.

---

[*] This case is figured in the Ophthalmological Transactions, Vol. iii.

[†] Med. Ophthalmoscopy, 1879, p. 250.

[‡] International Congress, London, 1881. *Vide* also Transac. Ophth. Society, vol. iii., p. 132, Dr. Barlow.

[§] Ophth. Trans., Vol. ii., p. 260.

[‖] Archives of Ophthal., 1883, p. 315.

So little confidence had Cohnheim in an essential histological character that he insisted upon inoculation of animals as affording the only proof of the tuberculous nature of a morbid growth, and his opinion is worthy of the utmost respect. In a paper entitled "Tuberculosis from the standpoint of infection," he enunciates the following law:—"The experimental infection of the iris with a tuberculous substance is *always* followed by general infection of the body."

Hosch* has practically demonstrated the value of this method; he enucleated the right eye of a youth, aged 17, for a growth within it, the nature of which could not be determined. The centre of the mass was undergoing caseous change. Some of the caseous matter introduced into the anterior chambers of three rabbits produced an eruption of tubercles on the irides in from twenty-two to thirty-nine days, and these tubercles when again used for inoculation caused a similar result in twenty-three days. Hosch notes that in the tubercles neither giant cells nor bacilli could be found. Here we have a triumph of pathological research carried to absolute demonstration. The credit of first proving the practical utility of this diagnostic method is due to Dr. Samelsohn, of Cologne, who, in 1878, after one or two failures, verified his diagnosis in this manner.

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* Archiv. d'Ophthal., vol. ii., No. 6.

We cannot turn from this, perhaps the most interesting part of our subject, without referring to the experiments of Baumgarten, Hansell, and Deutschmann.

Baumgarten injected blood drawn from a tuberculous animal into the anterior chamber of the eyes of other animals; within four weeks the iris became tuberculous; this was followed by rapid infection of the whole system, and blood drawn from the infected animal reproduced tuberculosis as often as desired. Thus Baumgarten has demonstrated the occurrence of tuberculous extension by the vascular channels. We shall see later on that Deutschmann has done the same with regard to the lymph spaces.

Hansell's * experiments of inoculating material taken from lupus and from syphilitic gummata upon the iris and cornea are, if substantiated, of exceeding value. I presume they were undertaken to strengthen the position of tubercle-inoculation, in reality they shake it. The experiments were made with the thin contents of a gumma, which was still intact; on the 25th day after inoculation iritis appeared in both eyes, together with the growth of granulomata and gummata in the ciliary body; the animal died after six months, of marasmus. The lungs and liver were infiltrated with small tumours like tubercles, but differing from them in their excessive vascularity and freedom from caseation. The result of the lupus inoculation was negative. This crucial test places investigators in a position of extreme difficulty, for it is impossible to deny, assuming of course that Hansell's experiments are as reported, that the result of syphilis inoculation, macroscopically, microscopically, and pathologically, are practically identical with those of tubercle inoculation, whilst lupus, which Charvot classifies as cutaneous tuberculosis, is unable to reproduce itself by inoculation into the chambers of the eye.

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* Græfe's A.f.O., Bd. xxvii., 3, p. 93.

Deutschmann undertook to prove, if possible, the method of choroidal and neural infection from tubercular meningitis. He inoculated the meninges with tubercle, either human or bovine. Within a very limited period the optic nerve sheaths became involved, not by propagation *in continno*, but by metastasis, the infecting cells passing along the lymph space within the sheath. They lodged here and there, but were specially detained at the lamina cribrosa, and here they developed as tuberculous nodules. In one of my drawings, taken from a case of tubercular meningitis, the tubercles are seen to have developed in just this situation. These experiments of Baumgarten and Deutschmann are interesting to the physician as explaining, so far as experiment can, the dual method of general constitutional infection and the frightful rapidity with which every organ of the body may become packed with tubercle. Deutschmann shows how the infecting cells may travel along the lymph spaces which accompany the nerves, and forming fresh centres wherever they settle, may finally pour into the vascular system. Baumgarten goes a step farther, and completes the chain by showing the blood teeming with these same organisms which have the power by amœboid movement of passing through the capillary walls, without visible rupture, by the process known as diapedesis, and infiltrating the tissues on every side.

Tubercle of the eye secondary to its development elsewhere.—Here the value of the ophthalmoscope cannot be over-estimated, affording as it does, in conjunction with other means, incontrovertible evidence for a diagnosis. I am indebted to my friend, Dr. Ashby, for permission to make a drawing of miliary tubercle of the choroid, as seen with the ophthalmoscope, from a patient of his own in the Pendlebury Hospital. The case, which is fully reported elsewhere,* was one of marked miliary tuberculosis with pyrexia, assuming at first the appearance of typhoid. Dr. Ashby examined the eyes with the ophthalmoscope, found two nodules, and at once established the diagnosis. Four days later there were at least eight, giving us some idea of the rapidity with which these growths develop. From the date of the child's first failing to her death less than three weeks elapsed, within which time all the viscera were loaded with tubercle.

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* Med. Times and Gaz., July 19th, 1884.

Ophthalmoscopically these little rounded nodules are suggestive of their nature; they surround the disc in number varying from two or three to twenty or thirty, and develop at the lamina cribrosa for the reasons brought out by Deutschmann's experiments. In size they range from the point of a pin to its head, rarely they exceed the size of the disc except by coalescence. In colour they are whitish pink, or almost white, and they are evidently subretinal because the retinal vessels course over their summits. They develop in the structure of the choroid, and advancing towards the retina cause atrophy of the pigment until they become ophthalmoscopically visible. They consist, as do all these miliary masses, of an aggregation of lymphoid cells, with here and there encapsuled centres of highly refractive nuclei or giant cells, within which the bacillus should be found. These masses are prone to caseous degeneration in conjunction with tubercle in other parts of the body. Their microscopic features are well shown in the photographs.

There is yet another appearance in the fundus, for the pointing out of which we are indebted to Dr. Barlow;* it is described as a fine dappling of the choroid with what Barthez and Rilliet have termed in the liver, tubercular dust, and is due to innumerable points of tubercle, scattered throughout the choroid. I have never seen this condition myself; it is more likely to come under the notice of the physician than the surgeon.

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* Ophthalmological Trans., vol. iii., p. 132.

Undoubtedly it is in acute miliary tuberculosis that we most frequently find choroidal tubercles, but they also occur in chronic phthisis, assuming an appearance indistinguishable from the nodules of acute tubercle.* Authors differ as to their frequency in uncomplicated tubercular meningitis. Dr. De Wecker,† indulging in generalities, believes them to be invariably present. Dr. Garlick,‡ a close observer, believes them to be rare, and quotes statistics. I think we may assume that if the patient lives long enough tubercle cells will descend the lymph spaces of the optic nerve and develop in the choroid around the papilla, but until the eyes are examined microscopically it is not possible to determine their absence or presence in the stroma of the choroid.

I may, in conclusion, say a word as to the treatment of primary tubercle of the visual organs. Recent investigation has placed the disease on a different footing to that which it held when this question was discussed in Paris, in 1879, by the Société de Chirurgie. Judging tubercle of the eye under any conditions to be a local manifestation of a general constitutional condition, the majority of the speakers in that discussion were opposed to the plan that commends itself to us. We believe that tubercle of the eye-lid may be treated constitutionally with a fair prospect of perfect recovery and exemption from constitutional infection. But when the globe is attacked enucleation is imperative; the eye is certainly lost as an organ of vision, and whilst it remains it does so as a standing menace to the health of the individual.

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* Bock found evidence of tubercle in nineteen out of twenty-three globes removed from patients who had died of chronic phthisis, the proportion, 82 per cent., being larger than that usually considered demonstrable.

† Ocular Therapeutics.

‡ Lancet, 1877. June 14.

Conjoined with removal, such constitutional treatment as seems good in each case is, of course, to be employed.

NOTE.—This paper was read before the Manchester Medical Society in November, 1884, and was illustrated with numerous coloured drawings, microphotographs, and projection images, most of which cannot be reproduced here. The accompanying microphotographs are selected as desirable illustrations of the paper on certain points. The microphotographs were taken by Messrs. Johnson and Watts, who, although amateurs, have executed their work in a manner which calls for my warmest thanks and congratulations.

R. DEUTSCHMANN (Göttingen). Pathology of Sympathetic Ophthalmitis. *Von Græfe's Archiv.*, *XXX.*, 3, *p.* 77.

Deutschmann has already demonstrated the transmission of inflammation from one eye through the optic nerves and their sheaths to the other eye (*vide* O. R., Vol. II., p. 22, and Vol. III., p. 304). In those experiments there was no migration of the spores of aspergillus fumigatus (the material used to excite inflammation), and as no other micro-organism was present, Deutschmann suggested that a chemical irritant was the active agent in the process. He has now succeeded in producing distinct sympathetic inflammation not alone by pure cultivations of aspergillus, but also by the injection of croton oil.

The first rabbit into whose vitreous croton oil was injected died within eighteen hours. The optic nerve and its sheath were inflamed as far as the chiasma, and the pia mater at the base of the brain was also infiltrated. The second rabbit lived four days. On the third day nothing remarkable could be observed in the second eye, but on microscopical examination *post mortem* the optic nerve on that side was found to be inflamed, the inflammation extending from the chiasma to the globe and increasing in intensity as it neared the latter. This inflammation started from the injected eye, and passed up the corresponding optic nerve and its sheath, decreasing in intensity as it neared the chiasma. The pia mater was also affected.

As it is probable from Leber's experiments (*vide* O. R., Vol. III., p. 332) and clinical experience that sympathetic inflammation in the human eye is always septic in its nature, Deutschmann proceeded to experiment with pure cultivations of staphylococcus pyogenes aurens. This was injected into the vitreous of one eye. On the second day symptoms of meningitis appeared, and the papilla of the second eye was congested with dilated and tortuous blood-vessels. The rabbit died on the third day, and a purulent inflammation was found extending from the injected eye along the optic nerve and its sheaths to the chiasma, decreasing in intensity as it advanced ; thence it spread down the other optic nerve, its intensity increasing as it neared the globe, and the papilla of this eye was infiltrated with pus cells. The pia mater was also in a state of purulent inflammation. In all these inflamed parts the presence of staphylococcus pyogenes aurens was easily demonstrable.

An attempt was made to obviate meningitis by using very diluted solutions, but of five rabbits all but one died, and this one showed no sympathetic inflammation even after several weeks. In this case the infected eye collapsed after an attack of acute purulent panophthalmitis, ending in perforation of the outer tunic. The second eyes of all the others were attacked by sympathetic inflammation, and it always commenced in the optic papilla. In one no meningitis was present, but the blood contained spores of staphylococcus, which furnished material for further experiments. In all of them the existence of meningitis was exceedingly doubtful. The condition of the optic nerves and chiasma corresponded exactly to the description given above. There was also marked inflammation of the following parts in the sympathising eye, viz.: the retina surrounding the papilla, the posterior portion of the vitreous, and the posterior uveal tract. The early death of the rabbit prevented the inflammation from extending to the iris and anterior portion of the globe. Deutschmann, however, succeeded in producing destructive inflammation of the eyeball, with iritis and keratitis, by injections of the same coccus into the optic nerve itself. The nerve was first divided behind the globe, and the injection was made into its peripheral end. This end was then ligatured to prevent infection of the system. He found that it always took several days for the inflammation to spread through the vitreous and choroid to the iris.

Deutschmann explains the migration of the septic organisms from one optic nerve to the other, without implication of the pia mater, by the assumption that the passage of lymph from the eyeball to the brain is opposed by greater obstacles than those that oppose its flow in the reverse direction. This is justified by the result of an experiment in which Indian ink was injected into the optic nerve sheath, and the rabbit killed after four days' interval. All the colouring material was found between the place of injection and the globe, none of it having made its way towards the brain.

Deutschmann examined twelve eyeballs which had been enucleated after the outbreak of sympathetic ophthalmitis in their fellows.

1. A case already published by Leber (*vide* O. R., Vol. I. p. 7), where sympathy occurred after optico ciliary neurotomy, and Leber found moving bodies in the fresh specimen. Deutschmann found single and double cocci, and also double bacilli, in the vitreous, optic nerve, and optic nerve sheath—aniline staining.

2. Purulent deposit in optic nerve and its sheaths. Preparation not well preserved; micro-organisms not looked for in consequence.

3. Pus cells in optic nerve and its sheaths, and typical single and double cocci.

4. Pus cells in optic nerve and its sheaths—aniline staining not tried for same reason as in No. 2.

5. Pus cells in papilla and external nerve sheath; micro-organisms not demonstrable with absolute certainty.

6. Papilla swollen, nerve sheath dilated, and connective tissue hypertrophied. Too badly preserved for anything further to be made out.

7. Some few pus cells in inner nerve sheath; nerve and its sheaths inflamed. A very old, ill-preserved specimen; micro-organisms, therefore, not looked for.

8. Connective tissue of papilla hypertrophied, cell proliferation in nerve and its sheaths. Pus cells in inner sheath. Not suitable for examination by Koch's methods.

9. Pus cells in optic nerve and its sheaths. Not examined for micro-organisms for same reason as in No. 8.

10. Pus cells in nerve and sheaths. No certain evidence of micro-organisms in these parts, but groups of cocci and double cocci found in the ciliary region.

11. Pus cells in papilla, optic nerve and inner sheath. Groups of cocci in vitreous and in optic nerve. In the latter they were found five mm. from the globe (five mm. of the nerve had been removed with the eyeball.)

12. Abscesses in vitreous, with groups of minute cocci. Doubtful evidence of either pus or cocci in optic nerve. This case is the only one of the twelve in which sympathetic inflammation was not present at the time of enucleation. All these globes were old specimens, and had been lying long in preserving fluids.

Only six of the twelve eyes were in a fit state to be examined for micro-organisms, and in five of these micro-organisms were found.

Deutschmann has, however, demonstrated in recent specimens that the human eyeball does contain pathogenic micro-organisms in sympathetic inflammation.

Case 1. Eyeball perforated by a hay fork; purulent infiltration of all vascular tissues of globe, and severe sympathetic ophthalmitis of the other eye. Cocci and double cocci found in the optic nerve.

Case 2. Perforating wound; prolapse of iris. Discharged apparently well; seven months later distinct sympathetic iritis, the injured eye not irritable, and with fair sight. Improvement two years later, phthisis of the injured globe with injection and tenderness on pressure; almost total occlusion of pupil in sympathising eye. Only one yellowish deposit found in the globe in the cicatrix in ciliary region. Successful cultivation experiments with this material.

Case 3. Large perforating wound of cornea and sclerotic of two years' standing, with synechia anterior, globe soft, vision quantitative. Second eye, sympathethic iridocyclitis. No examination for micro-organisms made as globe was reserved for cultivation experiments which were successful. A yellowish deposit found in ciliary region.

Case 4. Alleged spontaneous inflammation of four years' standing. Eyeball soft, tender, amaurotic, total synechia posterior, etc. Second eye sound, but blind eye enucleated as a precaution. Yellowish purulent deposits found in ciliary region, which contained numerous micro-cocci.

Deutschmann found by cultivation that the micro-coccus present in all these four cases was identical with Rosenbach's staphylococcus pyogenes albus. It possessed the same pyogenic characters as the staphylococcus pyogenes aurens. Injected into the vitreous of a rabbit's eye it produced intense inflammation spreading to the papilla and up the optic nerve to the papilla choroid and vitreous of the other eye. The rabbit then died, and fresh cultivations of the same malignancy coüld be obtained from its blood. It is interesting to observe that though the micro-organisms had been in the eyeballs two, three, and even four years they had lost none of their propagating powers. He succeeded also in finding these organisms in the sympathising eye in the human subject. A man received a severe injury and would not allow enucleation until after the outbreak of sympathetic ophthalmitis. About a year after the injury a large iridectomy was made, and the lens extracted without good results. By cultivation a crop of staphylococcus pyogenes albus was obtained from the excised iris, and this excited purulent iridocyclitis when introduced into the anterior chamber of a rabbit's eye. He is inclined to believe that the inflammation in the first affected eye travels most frequently directly from the choroid to the internal nerve sheath and the intra-vaginal space. He points out also that the smallest possible quantity of septic matter is sufficient to excite sympathy, though it may not have to any extent propagated itself in the originally injured globe.

Support is given to the view that sympathetic ophthalmitis is carried by the optic nerve by a number of published cases in which papillitis was one of the earliest, if not the earliest, sign of sympathy.

The following three cases are added in a postscript:—(1) Purulent iridocyclitis after discision. (2) Phthisis after injury, with suppuration of wound. (3) Suppurative iridocyclitis after injury. All three globes were enucleated before the outbreak of sympathy, and in all these staphylococcus pyogenes albus was found.

Addendum to Deutschmann's paper.

The following case is published by Deutschmann in support of his theory:—Perforating wound of cornea, iris and lens in a boy of fifteen. Iridectomy and extraction of most of lens. Subsequently yellowish reflex from fundus. Enucleation refused till after outbreak of sympathy, which appeared first as congestion of disc with dilated tortuous vessels, diffuse grey discolouration of retina, vitreous and iris normal, but extensive keratitis punctata. The injured eye was enucleated, and the aqueous chamber of the sympathising eye punctured with a broad needle. As Deutschmann expected, all the deposit on back of cornea came out with the aqueous, thus showing that it was not a purely inflammatory exudation. It consisted of micro-organisms, endothelium, a few lymph corpuscles, and a fibrous network. These micro-organisms were found to be the same staphylococcus pyogenes albus so frequently met with previously. Injected into the anterior chamber of the rabbit they produced destructive ophthalmitis (chronic irido-choroiditis). The enucleated globe contained colonies of the same microbe. Certainly no demonstration could be practically more complete than this so ably given by Deutschmann, both of the infectious nature of sympathetic ophthalmitis, and of its transmission through the optic nerves and their sheaths.

AUGUST CHARPENTIER (Nancy). Analytical Researches on the Visual Functions.

Archives d'Ophthalmologie. (1) *Vol. II., p.* 234; (2) *Vol. II., p.* 308; (3) *Vol. II., p.* 487 (1882). (4) *Vol. IV., p.* 193; (5) *Vol. IV., p.* 291 (1884).

1. Having previously found that the same amount of minimum illumination was necessary to produce a retinal sensation in the case of surfaces 4, 16, and 144 mm. sq., respectively, at a distance of 20 centm. from the eye, it occurred to Charpentier to test whether the same held good for smaller surfaces. The experiments conducted for this purpose were so arranged that the eye could receive light from no other source than the luminous surface. Great care was also taken to eliminate the disturbing influence of different states of retinal adaptation.

The result showed that for surfaces smaller than 4 mm. sq., *i.e.*, 2 mm. in each direction, the illumination necessary to give rise to a sensation was inversely proportional to the extent of the surface.

This limiting size, beyond and below which the two different laws came into action, corresponds to a retinal image of 0·17 mm. (the object being at a distance of 20 centm. from the eye), and therefore very closely to the size of the fovea centralis, which, according to Koelliker, varies from 0·18 mm. to 0·25 mm. The same laws held good for retinal images occupying other portions of the retina as well as the centre. This curious circumstance of an excitation extending beyond the excited point of the retina and in which Charpentier believes there is something more definite than what has been called luminous induction or irradiation, led him to determine the illumination necessary in order that discrete points of a definite size and separated by definite intervals of darkness might be distinguished by the eye.

The first experiment consisted in placing in front of the graduator of the source of light, within a dark box, a black piece of paper in which four holes, two-tenths of a mm. in diam., were pierced at the four corners of a square, 1 mm. in size. On gradually increasing the light from zero, the first appearance which presented itself with a certain degree of illumination was that of a uniformly luminous surface; only when the illumination was greatly intensified did the separate points become visible, suddenly and distinctly, without any appearance of irradiation. If the eye were allowed to remain for ten or twenty minutes in absolute darkness, the diffuse luminous patch became visible under an illumination 30-50 times less intense, whereas the same amount of illumination under all conditions of adaptation was necessary to give rise to the sensation of discrete points. In repeating these experiments with different distances intervening between the luminous points, the same phenomena always presented themselves as long as the distance of separation did not exceed 2 mm., so that the general result arrived at was, that so long as the multiple luminous excitations occupied the same region of diffusion, the first effect of the light was to spread itself over this region, the perception of form or true vision, so to speak, resulting only after a more or less considerable increase in the illumination of the luminous points, and being, therefore, not improbably, owing to the excitation of other elements of the retina.

It was next found that within the limits experimented with, ·06 to ·6 of a mm., the illumination necessary for distinguishing two luminous points on a dark background was entirely independent of the interval which separated them. On the other hand, with two objects separated by a constant distance, the minimum illumination by which they could be distinguished varied inversely as their size. This last fact enables one to construct what Charpentier calls a physiological photometer, by means of which the strength of light is gauged by the size of the aperture illuminating definitely sized holes in an obscure curtain, to the extent just necessary to render them visible as separate points. This method of photometry has the advantage over other methods, in that it enables us to compare the luminosity of differently coloured lights.

The next experiments were made with a view of determining the influence of the extent of coloured surfaces on the distinction of the colours. From these experiments it was shown that for blue and yellow the sensitiveness varied in the same direction as the extent of retinal surface excited, though not in the same proportion as before, to that extent; for red and green the sensitiveness increases at first more rapidly than the surfaces and then more slowly (the change taking place for a size of retinal image from 1·30 to 1·60 mm.). From these facts Charpentier comes to the conclusion that Donders' method of determining the visual acuity for colours, which consists in determining either the distance at which a coloured object of a definite size can be recognised, or the size which must be given to such an object to be recognised at a given distance, is faulty in principle for the following reasons:—It cannot furnish values which are comparable for the different colours; that even if in this way we may be able to detect the fact of an increase or diminution in the colour sense, it gives neither the value of the change nor its relation to the acuity of other eyes for colour; and finally that in cases where it is necessary to give the coloured object such a size as to make the retinal images greater than two hundredths of a mm. in order that its colour may be distinguished, the method is altogether defective, as after that the influence of the extent of surface on the sensitiveness may be neglected.

Further experiments revealed the interesting fact that if we subtract from the quantity of light required to produce a perception of colour that necessary to produce the simple primitive luminous sensation, what remains is found not to depend on the extent of the coloured surface. Again, the amount of illumination necessary to give the sensation of the different colours varies; it is much less for red than for blue.

2. In this paper the influence of the number of luminous points in the illumination necessary to give rise to their perception is discussed, the result of experiment showing that as long as their images occupied the same region of the retina, *i.e.*, a region about the size of the fovea, their number is without influence in this respect. The only factor found to influence the perceptibility under varying intensities of illumination was that of the size of the luminous points themselves, the superficial extent of which must vary inversely as the degree of illumination, as before stated.

Charpentier avoids framing any hypothesis to explain these facts, but remarks that there must exist some intimate association between contiguous elements of the retina, as if each element were independent it would always be aroused into physiological activity by the same degree of illumination, whereas the greater the extent of surface and consequently the greater the number of contiguous elements excited, the less the degree of illumination, or what comes to the same thing, the less the quantity of light affecting each element which is required to evoke its activity.

3. Charpentier points out that the laws enumerated above hold good with sizes of pupil varying from 0·85 mm. to 8 mm. in diameter, *i.e.*, from ½ mm. to 50 mm. in superficial extent. They are, therefore, independent of irradiation. (On this point, however, see Leroy, Vol. iii. of same journal.)

4. Charpentier determined in the experiments which form the subject of this next paper the visibility of black points on a

more luminous background. In order to make sure of the absolute darkness of the points as well as of the constancy of their form and size they were pricked on white paper with a needle, and examined under the microscope, and the paper was then placed in an absolutely dark tube, and illuminated by reflection. The results of a number of varied experiments, fully detailed in the paper, showed that as in the case of the luminous points, their number and distance apart were without influence on the degree of illumination of the intervening space necessary to render them visible. On the other hand, their size, though of influence in this respect, was not so according to the same law of inverse proportion between size and illumination as had been found to hold good for luminous points on a dark background. For the visibility of the small dark points more light was required than for the large ones, but the difference was only about half of that required for luminous points. This fact Charpentier explains in the following way: The diffusion or dissemination of the light over the retina, which has already been described, and which practically exhibits itself in an apparent loss of luminosity (an apparent loss which is the more pronounced the smaller the luminous surface), is of relatively small influence in the case of the dark points, owing to the extent of the luminous interspaces being so much greater than that of the dark points, and, therefore, not markedly varying with the increase in the size of these points.

Another difference is that the visibility of the black points is greatly influenced by the state of adaptation of the retina, being considerably increased when the eye has been for some time kept in the dark. This point is strikingly shown by experiments made alternately with either eye, when the one has been kept in complete darkness for twenty minutes prior to the experiments, whilst the other has remained uncovered.

5. The experiments of the author so far had shown that for an object composed of several luminous points the minimum illumination which could bring about the sensation of light diminished as the number of points spread over unity of surface increased, whereas the maximum illumination of the same object necessary to evoke the sensation of colour was solely dependent on the size of each point.

The relation existing between these two minimum illuminations in the case of different colours was the next point investigated. Experiments made to determine this point brought out the interesting fact that the quantity of light required to produce the sensation of colour is not proportional to that which characterises the sensation of light, and also that the quantity increases with the refrangibility of the rays. This increase is at first slight towards the red end of the spectrum, but from the yellow onwards is extremely rapid, so that for blue rays the proportion between the minimum-light illumination and the minimum colour illumination is 160 times greater than for red rays. As further the augmentation which has still to be made in the illumination in order that the points may be distinctly seen is the same for all rays, it becomes possible to recognise the refrangibility of any light rays irrespective of the sensation of colour which they produce.

The results of his experiments render it probable, as Charpentier remarks, that the sensation of light is produced by the excitation of other elements than are set in action when distinct vision or the sensation of colour is elicited. Charpentier further suggests that the colour sensation may be due to an elaboration by the nervous centre of the different proportions existing between the stimuli necessary to set in action the two distinct elements.

Taking these certainly very interesting and novel results of Charpentier in conjunction with the results recently obtained by Bjerrum in his investigations into the pathology of the light sense, and which have been confirmed by Samelsohn and others, it does seem very probable not only that Charpentier's view is correct, namely, that there are two distinct ultimate elements stimulated by light rays, but also that these are the hexagonal pigment cells and the cones of the retina. The light sense is pretty much the same all over the retina, and there is also an even distribution of the pigment cells. Moreover, the conditions which cause an alteration or destruction of these cells are also associated with defective light perception. On the other hand the greater and greater sparseness of the cones as we pass from the centre to the periphery of the retina might well account for the diminution of visual acuity, and also for the greater luminosity necessary to evoke colour sensations at the periphery. Again, the hypothesis referred to, to account for the nature of colour perceptions, is not inconsistent with many known facts connected with colour vision, among which may be mentioned the recent beautiful investigations of Donders, though we fail to see as yet how the phenomena of complementary colours and coloured after-images can receive an adequate explanation on that hypothesis. Possibly when the proportions existing between the minimum light-perception illumination and the minimum colour-perception illumination for a series of colours exactly complementary have been determined, more light may also be thrown on this obscure subject.

GEORGE A. BERRY.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, DECEMBER 11TH, 1884.

JONATHAN HUTCHINSON, F.R.S., President, in the Chair.

Reported by DAWSON WILLIAMS, M.D.

Unilateral Irido-Choroiditis.—Mr. Marcus Gunn showed a child, aged eight years. There were numerous synechiæ in the right eye; the optic disc was occluded by a dense light grey mass with well-defined edges, which protruded forward into the vitreous; vessels could be traced over it. Stretching inwards from this structure was a narrow detachment of the retina, and another detachment was seen in the region of the macula. There were numerous patches of choroidal atrophy. He considered the lesions to be due to congenital syphilis.

Retinitis Albuminurica in the Left Eye only.—Mr. Henry Eales showed a man, aged 25, single, a striker, who, while drunk, had had a fall on some steps and twisted his left side. This pained him for a fortnight severely; on the following morning he noticed his sight dim, there being "a cloud over the upper part of his sight." On examination three weeks after the accident the right eye was normal, while the left eye presented all the typical appearances of retinitis albuminurica; the urine contained albumen in small quantity. He never had scarlet fever, syphilis, or, in fact, any illness till the present. He was treated as an in-patient, by frequent purgatives (mostly of elaterium), hot baths, and liq. ferri perchlor. and digitalis; the albuminuria and retinitis rapidly subsided; careful investigation still showed albumen in the urine about two hours after breakfast in slight traces. No casts had been found. The retinitis was typical, the retina being covered by large milky opaque effusions, with a few hæmorrhages, the yellow spot and disc being especially affected. The right eye had never shown a sign of retinitis, even of the slightest kind. The present state was as follows: right eye quite normal; disc of left eye white and atrophied, the margin blurred; retinal arteries reduced to threads; several glistening dots in the retina round the macula, as seen after typical retinitis albuminurica. The urine continued to show a trace of albumen after breakfast, but at no other time. Mr. Eales referred to Yvert's case of unilateral albuminuric retinitis in a man with only one kidney. (*Vide* O. R., vol. II., p. 199.)

Mr. McD. McHardy showed a drawing of uniocular retinitis in albuminuria. The patient had been under the care of Dr. George Johnson, and the case was shown at the International Medical Congress in 1881. He referred to another reported case of uniocular albuminuric retinitis, in which also there was but one kidney.

Dr. Stephen Mackenzie related a case under the care of Dr. Hughlings Jackson with what might be taken for albuminuric retinitis; the presence of albuminuria appeared to confirm the diagnosis, but the optic nerves were more swollen than is usual in albuminuric retinitis, and had rather the appearance seen in tumour. The patient ultimately had convulsions, followed by coma and death. The necropsy revealed tubercular meningitis; only one kidney, and this not diseased. He believed that it was, in certain cases, impossible to decide, from the ophthalmoscopic appearances, whether the lesion was albuminuric retinitis, or whether it was a condition which sometimes occurred in connection with brain-disease. Recently Mr. Morton had referred a case to him where the appearances resembled albuminuric retinitis. The necropsy showed tumour of the corpus striatum and optic thalamus. He was inclined to suggest the presence of some intracranial lesion in Mr. Eales's case. In tumour cerebri the neuritis was not unfrequently one-sided, in the early stage.

Mr. Nettleship thought the patches in the choroid were not due to retinitis; he doubted whether the patches were coincident in time with the papillo-neuritis; and thought, on the contrary, that they were probably of long standing. The condition of the papilla pointed to the occurrence of thrombosis as not improbably the cause of the lesions seen in the fundus. If called on to make a diagnosis, he would propose this: arterial thrombosis in an eye which had previously had some choroidal disease leading to atrophy.

Mr. Eales, in reply, said that he had been at first inclined to accept the theory put forward by Mr. Nettleship, but the distribution and mode of development of the disease appeared to him to be opposed to it.

Vesicle of Cornea.—Mr. Anderson Critchett and Mr. Juler showed a case of large vesicle of the cornea; it had existed for about five months, and had been about 4 millimetres in diameter at its base, but had recently burst. The chief symptoms were photophobia, lachrymation, and pain. The eye had previously been quite sound.

Hyphæma.—Dr. W. A. Brailey showed a case of hyphæma secondary to some deeply seated intra-ocular change; the prominent signs were double irido-cyclitis, with hæmorrhage into the anterior chamber, and great variation in the tension. The case was of interest owing to the obscurity which surrounded its mode of origin. There was no history of gout.

The President observed that slowly progressive iritis, with hæmorrhages into the anterior chamber and vitreous, generally occurred in persons with a gouty history.

Hysterical Deviation.—Mr. Adams Frost showed a case of conjugate deviation of the eyes to the right in a hysterical woman aged 25.

Cocaine in Ophthalmic Practice.—Mr. Snell had made use of cocaine in extraction of cataract, needling, iridectomy, for conical cornea, tenotomy, for foreign bodies in eye, pterygium, and for operations about the lachrymal passages. In the operation of tenotomy some pain was experienced in hooking up and cutting the tendon. In iridectomy only the pulling out and cutting of the iris was felt. In the lachrymal operations it was of no use, and in the operation for tarsal cyst, though the primary incision was not felt, the subsequent steps were painful. Its mydriatic effect uncertain.

Cocaine.—Mr. Nettleship had operated on about seventy eyes under the influence of cocaine since October 10th, on which day six eyes were so dealt with. The operations were as follows:—

	Eyes.
Extraction of cataract, with iridectomy	12
,, ,, after preliminary iridectomy	4
,, soft cataract through small incision without iridectomy	4
Iridectomies for various purposes	16
Conical cornea (apex excised)	1
Discision	8
Iridotomy	2
Scraping corneal ulcers	2
Tenotomy	17

It was used in several other operations (chiefly tenotomies), but without the fact being recorded, and it has been used almost daily for several weeks in cases of foreign body on the cornea. The preparations used were a two per cent. watery solution, a 2·5 per cent. solution in vaseline and in castor oil, occasionally a four per cent. watery solution, and of late usually gelatine discs (made for the writer by Savory and Moore about the middle of October), each disc containing $\frac{1}{200}$th of a grain of cocaine hydrochlorate. These have always caused complete anæsthesia of the cornea and conjunctiva of healthy (*i.e.*, non-inflamed) eyes; but the iris has never been completely anæsthetic in any of the operations involving iridectomy, even after frequently repeated applications; indeed, it is doubtful whether the sensibility of the iris was lowered at all in any of the cases. In one preliminary iridectomy the patient became so unruly when the iris was grasped that the operation had to be completed under chloroform, and with a few other patients some difficulty was experienced at the iridectomy stage, although the operations were satisfactorily finished without general anæsthesia. In tenotomy there is sometimes slight pain, when the parts are put on the stretch by the hook and scissors. But with the exception of the iridectomy mentioned above which had to be finished under chloroform, the operations have almost invariably been completed without a hitch, with next to no discomfort to the patient, and with no bad after effects. Had cocaine not been in use, the writer would have given ether or chloroform to about one-half of the patients referred to. Cocaine was used prior to application of actual cautery to granular lids on several occasions with partial success; and in a case of cauliflower warts about the inner canthus, and in a case of lupus on the skin of the lower lid, with little or no success. Cocaine greatly relieved the photophobia in several cases of corneal ulcer. When the ciliary region is much congested, it has remained sensitive to deep pressure; though the conjunctiva has seemed anæsthetic to light pressure, and the cornea completely so. The mydriatic effect is often less marked in inflamed than in healthy eyes, and repeated applications to congested eyes have not produced any decided blanching. A single application to the healthy eye causes complete anæsthesia in two to three minutes; about four minutes later this begins to diminish, and has entirely passed off about twenty minutes from the time of application. Retraction of the upper lid begins in four or five minutes, and lasts about half-an-hour; during the same time well-marked blanching of the surface of the globe occurs. Mydriasis begins in three to ten minutes, is at its maximum ten to fifteen minutes later, and lasts in all at least twelve hours. The reflex and associated actions of the pupil are present throughout. Accommodation, though scarcely affected by one application, is almost completely paralysed, but for a very short time, by repeated applications. A single drop of eserine solution acts as fully and quickly as if no cocaine had been used. Probably the retraction of upper lid, whitening of eyeball, and mydriasis are caused by spasm of muscular fibres innervated by the sympathetic. The very fleeting cycloplegia caused by the repeated use of the drug may be due to ischæmia of the ciliary muscle from spasm of its nutrient arteries.

Cocaine.—Mr. Arthur Benson had found that the specimen of cocaine with which his previous experiments had been conducted was contaminated, probably with eserine. When the pure drug was used, the pupil remained dilated for several hours. The most minute trace of eserine counteracted the dilatation. In himself, the anæsthesia reached its maximum in two or three minutes, and was extremely local; he could, by applying a small quantity, produce anæsthesia of one-half of his cornea and conjunctiva, whilst the other half retained perfect sensation. The degree of anæsthesia depended, within limits, upon the amount of the drug employed; repeated applications of a two per cent. solution produced almost total anæsthesia of the cornea and conjunctiva, so that the removal of foreign bodies and other operations could be performed painlessly The sensibility of the iris seemed to be only slightly, if at all, diminished. On the tongue and lips a slight dulness of sensation alone was produced. In cases of photophobia (keratitis and conjunctivitis) it was of great value in facilitating the examination, as well as from a therapeutic point of view. In normal eyes it usually produced an increase of tension amounting to + 1 within from half to one hour, the tension falling before the dilatation ceased. He had not tested its effect upon the tension of diseased eyes. He had removed an aural polypus, having applied cocaine to the ear with apparently good results.

Ophthalmic Models.—Mr. Priestley Smith exhibited a series of models used by himself in teaching:—

1.—A large diagram of the eye in section, one half sliding upon the other so as to shorten or lengthen the globe in imitation of hypermetropia and myopia.

2.—A spherical wooden model, with glass cornea, iris, a moveable lens to simulate accommodative changes, and a ground glass retina. The globe can be shortened or lengthened. It exhibits the condition of the retinal picture in emmetropia, hypermetropia, and myopia, with and without accommodation, with and without glasses.

3.—A lens and moveable painted retina, mounted on a block, used for the same purposes as the foregoing, and to demonstrate the "fundus-image" test, &c., to a class, without artificial illumination.

4.—A simple artificial eye for beginners with the ophthalmoscope. A cylindrical block of wood, hollowed, carrying a small lens with the iris painted on it in front, a moveable card-retina behind. It may be hung upon the wall of the dark room. Various degrees of refraction, and right or left eye, can be imitated.

5.—A "cornea" of india-rubber, cut from the side of a large ball. Pressed upon at the edges it assumes unequal curvatures in different meridians and represents corneal astigmatism. A large wooden "cylinder" to explain the optical correction of the same.

6.—The mechanism of the accommodation. A strip of thin elastic steel bent to the proper shape represents the outline of the lens in transverse sections. Silk ribands attached, one on each side, to the equator of the lens, and ending externally in spiral steel springs, represent the suspensory ligament kept in a state of tension by the elasticity of the choroid. Other ribands attached to these anteriorly represent the ciliary muscles. When the latter are pulled the traction of the suspensory ligament upon the lens is lessened, and the lens becomes more convex by its own elasticity.

7.—An apparatus for demonstrating operations with pigs' eyes. Two short cylindrical pillars cupped at the top receive the eyes; over these slide tubular caps, open at the top, which hold the eyes in place and bring them to the necessary state of tension. A gutta-percha mask with apertures at the eyes is laid over the whole.

8.—A model illustrating the causation of diplopia and its correction by prisms. Two cardboard cylinders, the eyes, rotate about their vertical axes; a convex lens in the side of each represents the refracting media; a piece of thin paper stretched across an opening at the opposite side, the retina. In the centre of each retina a small area, rendered more translucent by a drop of paraffin, represents the yellow spot; the portion of the image falling on it is clear and brilliant. The fixation object is a lighted candle. The model demonstrates the relation which exists in all ocular deviations between the deviation of the cornea and the apparent deviation of the image*

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* These models have been left, by request of members of the Society, with Messrs. Pickard and Curry, who will make others like them.

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HEREDITARY AMAUROSIS.

By John B. Story, M.B., F.R.C.S.I.,

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The affection which forms the subject of this paper is very incompletely described by the term "Hereditary Amaurosis," a title which was given to it by S. Sedgwick in *The Medical Times and Gazette* in 1862. The disease is more correctly defined by Leber in the article on "Diseases of the Retina and Optic Nerve" in the Graefe and Sæmisch Handbook as *optic neuritis resulting from hereditary and congenital predisposition.* That description of Leber's is based upon the records of fifty-five cases occurring in sixteen families, and so far as I can ascertain there has been hardly any important addition to the literature of this exceedingly interesting affection since Leber's article published in 1877.

The disease generally appears some years after the age of puberty. In ten of the sixteen families it occurred in only one generation; in the other six, two generations were affected; it has never been observed as yet in three successive generations. In no case was the father affected, and the mother was affected in only two instances, both of them being rather unusual forms of the affection according to Leber. In the one case the disease appeared at the climacteric period (as it did in my first case), and in the other bad sight was stated to have been present from the fifth year of life. Females are generally spared (only ten per cent. of the patients were females), but in five of the sixteen families the disease was inherited through the mother, though she herself was unaffected. In but one family did consanguinity play any part in the production of the disease, and in that the consanguinity occurred in the great grandparents.

The patients belong to the neuropathic class of Griesinger; many of them suffer from headache, migraine, vertigo, palpitation, tingling of the limbs, and convulsive attacks; they are excitable, and nervous, and one is stated to have had epileptic seizures.

The period of life at which the attack commences commonly varies between the 18th and 23rd year, but it has been observed from the 5th and 13th up to the 28th and 43rd years.

Both eyes have always been attacked, mostly with a short interval, six months being the longest interval observed by Leber.

The defect of sight generally makes its first appearance suddenly as a cloud or haze, which mostly increases for the next fortnight or month. Pain in the eyes or head is exceptional; subjective light and colour sensations are occasionally observed. The defect is mostly a pure central amblyopia often appearing as a distinct central scotoma, while the peripheral limits of the fields of vision are little, if at all, contracted. Hemeralopia, by which is meant that the patient sees relatively better in twilight, as is usual in retrobulbar neuritis, is a constant symptom.

Ophthalmoscopically there is usually found a slight haziness of the disc margins, and a hyperæmia of the papilla, the arteries not being contracted, but sometimes rather dilated, and white lines may be seen running along the edges of the vessels. Sometimes a peculiar streaky exudation is observed, and sometimes the appearances, in spite of advanced blindness, are altogether normal. After a time white atrophy of the papilla is observed, the nasal half being occasionally less affected than the temporal, and the retinal vessels are moderately contracted.

Recovery of sight is very rare, but there is usually sufficient peripheral vision left to enable the patient to walk about freely alone. Absolute blindness is, fortunately, also uncommon.

Treatment is practically unsuccessful. Mercury, iodide of potash, diaphoesis, local blood letting, nitrate of silver, strychnine, and galvanism of the sympathetic have all been tried without distinct benefit.

Prof. Fuchs has recorded twelve cases of the kind in the *Klin. Monats. Bl. f. Augenheilk.*, for 1879, p. 332. Unfortunately the large majority of them were known to him only through description by relatives, but there can be but little doubt that the diseased condition was essentially the same as in the cases described by Leber. All Fuch's cases were males. The first family consisted of four daughters and four sons; of these, three (males) became affected. The second family consisted of four daughters and two sons; both the sons were affected. One of the healthy daughters married and had five sons, all of whom were attacked; she also had one daughter, who escaped. The third family contained two sons, both of whom were affected, each having the central scotomata which characterise the disease.

To the already published cases I can now add five, all occurring in one family, but only two of the five have been actually under my own observation. One of these patients was a female, and this case exhibited a symmetrical defect in the fields of vision.

Case I. Miss S., aged 40, consulted me in May, 1884, on account of the condition of her left eye, which had been failing for about five weeks. She stated that her health had always been good. Six months previously the menopause had taken place, and shortly afterwards she suffered from a violent pain in her right eye, associated with loss of sight. For this she was treated unsuccessfully by one of the best of our Dublin oculists. The left eye became dim painlessly. She stated that in both eyes the centre of the field was most affected, and that her sight was relatively better in twilight or on a dull day. I found her vision very defective: the right eye counted fingers at ¾ metre, and left at 4 m., left read Jæger No. 16.

The hemeralopia I ascertained as follows:--By darkening my consulting room I so reduced the illumination that I could only read Jæger No. 16 at 2 metres; at this distance and with this illumination Miss S. read Snellen 40. By increasing the light I was easily able to read Jæger No. 6 at the same distance, while the patient's vision was not in the slightest degree improved.

In both eyes tension normal, pupils wide and sluggish, commencing cataracts in the lenses. The right papilla was atrophic, white with very small arteries, and small dark tortuous veins. The macular region was somewhat speckled by what I took to be atrophic changes. The left optic disc was hazy, margins cloudy, arteries small, veins small, black, and tortuous. There was spontaneous venous pulsation in both retinæ. There was no defined exudation in either retina, but there was in the left a patch of hæmorrhage to the lower outer side of the disc, and a fresh hæmorrhage occurred during the time I had the patient under my observation. The macular region of this eye was of a deep red, and the rétina around it appeared somewhat œdematous.

The peripheral limits of the fields of vision were approximately normal, but a large central scotoma could be detected in each field. These scotomata were negative, absolute, so far as colours were concerned, but only relative for white. Colour vision, indeed, was so defective that I found it impossible to take a chart of the fields for colour vision, but it was comparatively easy to map out the fields for white. The scotoma in the right field was pretty exactly circular, and extended to 20° from the point of fixation. That in the left field was more elliptical; it extended only to 10° from the fixation point, and its lower boundary reached at one point only to 5°.

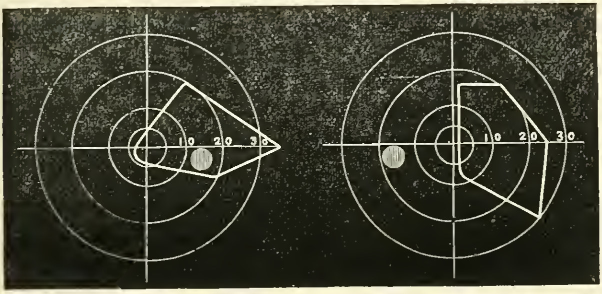
Four months later the fields of vision presented the appearances seen in the accompanying charts. The scotomata are seen to be symmetrical, each extending to the right side of the point of fixation. At this period the peripheral limits of the fields were still normal, but the vision of the left eye had sunk to counting fingers at only 1 m.

The case so far presented nothing of peculiar importance, but when I questioned my patient upon her family history I was informed that her four brothers had all gone blind in exactly the same way, as she termed it, "from the brain."

Case 2. The eldest brother got sunstroke in India, and also "ophthalmia;" was very like what she is; could only see in twilight; died at age of 23; mind sound to the last; it was, however, of epileptic fits he died.

Case 3. Second brother, while a medical student, aged 21, lost his sight, and became for a while excited; he used to drink, too, to excess. He afterwards became quiet, "settled down." He died of decline. The sister thinks his mind was not affected except by excitement from drink.

Case 4. Third brother got a sudden fright at death of eldest brother, and lost his sight either then or shortly afterwards. His mind went astray, and he died in a lunatic asylum.



Case 5. The youngest brother got a cold on a journey at age of 30. He had been in Australia, and the family thought he had passed "the delicate age." After the cold he became unconscious, but he was well in a fortnight, "as well as ever." Then in a month or so his sight went bad just in the same way as the sister's. His mind is usually sound, but he occasionally suffers from religious excitement, and takes dislikes to his family. He has had to be sent more than once to an asylum.

When he lost his sight he consulted a specialist, who told him he had a central scotoma. He is the only one of the family whom I have been able to see except two sisters. His age is now 45. With either eye he counts fingers at about 1m. Ophthalmoscope reveals simple white atrophy of both optic nerves with contracted arteries and veins, the latter slightly tortuous. The presence of a central scotoma could be easily demonstrated in the field of vision of each eye, but no chart could be attempted owing to defective fixation. He appeared to me dull and sluggish in intelligence.

The elder two sisters have good sight, but use glasses in reading. I have seen the eldest sister. Her eyes present nothing remarkable, but she, as well as the one whose eyes are affected, appears to be of a highly excitable disposition. During my interview with them they never stopped chattering, asking questions without waiting for answers, and contradicting each other as to unimportant details, and altogether were in a state of such intense and ill-regulated excitement that it was extremely difficult to arrive at the facts of the family history. What I have put down is the result of repeated questioning of each separately. There was no important discrepancy in the accounts they gave, and in the few details where they differed I have followed the narrative of the younger sister, my patient, who seemed the more sensible of the two.

We find then in this unhappy family that of eight children (four girls and four boys) five have suffered from this remarkable affection of sight. Of these five four are males, and all have manifested some sign or other of further nervous trouble. One died of epilepsy, two have been in lunatic asylums, and one suffered from mental excitement attributed by his sister to the effects of drink.

Upon the pathology of this obscure affection I do not presume to enter. Without the evidence of post-mortem records, to do so would be to travel into the realms of speculation. It is enough to state that the disease is a retrobulbar neuritis, or at least a neuritis of the peripheral extremity of the optic nerve, and that it seems to be complicated with other less obvious alterations in the nervous system.

The treatment I have used has been unsuccessful. Iodide of potash and mercury have been the chief remedies employed. I have not as yet tried galvanism, which seemed in one of Leber's cases to lead to a successful result.

PRECAUTIONS AGAINST MENINGITIS AFTER ENUCLEATION OF THE EYE.

By Priestley Smith,

Ophthalmic Surgeon to the Queen's Hospital, Birmingham.

Enucleation is followed by serious symptoms in only a very small proportion of cases, but that it does sometimes lead to meningitis and death is a fact which cannot be disregarded. One case of the kind was recorded lately by A. Benson (*O. R., Vol. III., p.* 293); another by Hill-Griffith (*Brit. Med. Journal, Dec.* 1884, *p.* 1273); in these communications ten more published cases were referred to, and two others were mentioned by speakers in the discussion on Dr. Griffith's case. The list would, doubtless, be a much longer one if every such disaster were placed on record.

I have myself seen two cases: The first occurred about twelve years ago, at the Birmingham Eye Hospital, the operation being not a simple enucleation, but the removal of a large ulcerated sarcoma originating in and protruding from the globe; the patient was an old man; purulent meningitis was found *post mortem.* The second occurred in my own practice; the patient was an elderly woman; the eye was hard, inflamed, and painful, but not obviously suppurating; swelling of the orbital tissues, eyelids, and cheek set in within a few hours after the operation, coma followed, and the patient died within forty-eight hours; the post-mortem record was orbital cellulitis and meningitis. In another case of my own, the patient was for a time in great peril, and would, I think, have died, but for the prompt employment of means directed against further retention and absorption of septic matter. It is to draw attention to such means, of which no mention is made in the communications above referred to, that I write this note; I do not doubt that others besides myself have employed them.

Kate C. (I 333), aged twenty-four, domestic servant, was admitted to the Queen's Hospital, January 12th, 1881, under the care of my colleague Mr. Wilders, with compound fracture of tibia and fibula and scald of face involving both eyes, caused by explosion of kitchen boiler on the day of admission. (A temperature chart was kept from the beginning to the end of the case.) The fracture did well, and need not be referred to further. The injury of the right eye proved unimportant; the left cornea suppurated, and on February 16th, in presence of commencing panophthalmitis and considerable chemosis, I excised the eye. For twenty-four days before the operation the temperature had been normal, varying—morning and evening—between 98° and 99.2° F. (36.7° and 37.3° C.) Then came the following:—

	MORNING. DEGREES.	EVENING. DEGREES.
Feb. 15th. Day before operation; cornea sloughing	99	99.6
,, 16th. Day of operation	99.8	98.2
,, 17th. Intense pain in orbit and head, dressings removed in the afternoon; great swelling of eyelids; wound syringed out deeply and freely with Condy's fluid and warm water, and this repeated every three hours	102.	104.6 (=40.3 C.)
,, 18th	103.2	103
,, 19th	102.2	101.6
,, 20th	101.4	102
,, 21st	101.6	102
,, 22nd	100.4	101.4
,, 23rd	100.4	101.4
,, 24th	99.8	101.2
,, 25th	99.2	99.6

On February 28th the temperature ran up again nearly to 104, and then during a period of four weeks it presented great fluctuations, being frequently normal in the morning, and running up to 101, 102, and once to 104 in the evening. I have not a daily record of the patient's state during this period. She suffered violent pains in the head for several weeks; was frequently delirious; showed great intolerance of sound, and of light to the remaining eye, and required enemata to obtain action of the bowels. The syringing, begun about thirty hours after the operation, appeared to produce a marked abatement of the dangerous symptoms for several days, but had no effect during the relapse and was then discontinued as unnecessary, the wound being healthy. Her hair was cut off, and ice bags were applied to the scalp. The diagnosis of meningitis was confirmed by my colleagues, Mr. Furneaux Jordan and Mr. Wilders. Six weeks after the operation, after a sudden rise to 104° in the evening, the temperature fell, thirty-six hours later, to the normal point, and showed little variation afterwards. The patient was not strong enough to leave the hospital until the end of the ninth week after the operation. She ultimately recovered perfectly, and resumed work as a general servant, wearing a glass eye.

The impression left upon my mind by this case was that the patient nearly lost her life through the absorption of septic matter from the wound, and that if, instead of tightly closing the eyelids in the usual way, I had from the first kept the wound purified by antiseptic injections, the danger would have been much less. In several subsequent cases of excision, performed while the eye and orbital tissues were inflamed, I have flooded the wound with a weak carbolic lotion at the close of the operation, and have allowed the compressive bandage to remain only so long as was necessary to restrain hæmorrhage, and have then used an injection a few times, until all danger, as shown by the thermometer, appeared to be past. In two cases I have found a very high temperature within twenty-four hours, but it has quickly subsided, together with the orbital cellulitis, upon which it appeared to depend. During the last twelve months or more I have in every case of enucleation put iodoform powder into the wound as soon as the bleeding is nearly over, and have used dry absorbent cotton wool pads instead of other dressing. The iodoform has, I think, a very decided effect in removing tendency to purulent discharge. The routine use of iodoform in this way, together with the immediate use of injections when the thermometer shows a marked rise of temperature, would probably make disasters after enucleation still more uncommon than they are at present. The wound is easily washed out by means of a fine indiarubber tube placed on the nozzle of an ordinary syringe. With such precautions, panophthalmitis need not, in my judgment, be a barrier to the operation.

TH. VON SCHROEDER (St. Petersburg). On the Permanent Consequences of Ophthalmic Migraine. *Klin. Monatsblat., f. Augenheilk, October*, 1884, *p.* 351.

Ophthalmic migraine, though usually recurrent. is in the large majority of cases a transient affection, both as regards the visual trouble and the other signs of cerebral disturbance which accompany it. It has, however, been pointed out by Charcot, Féré, and others that the aphasia, hemiplegia, hemianæsthesia, and other cerebral symptoms which in some cases form part of the temporary attack may prove lasting. The author records a case of this kind.

The patient, a man aged thirty, had suffered for ten years from migraine, with characteristic visual trouble. The attacks occurred about twice a month, sometimes oftener. They began with glimmering and loss of sight extending from the left side across the field of vision; then followed violent migraine and vomiting; the whole attack lasted usually until the following day. Occasionally the disturbance of vision passed off without headache; in the later attacks other cerebral symptoms, numbness of the left hand and leg, occurred, and twice there was loss of consciousness, after which the patient felt ill and weak for several days. A severe attack occurred in December, 1883, beginning with glimmering on the left, as usual, and shortly leading to loss of consciousness which lasted two days. On recovering from this, weakness of the left arm and leg and a defect of sight towards the left were discovered, and there was severe pain in the head, which lasted many days and frequently returned. Examined three months after the attack the patient was found to have left-sided hemiparesis hemianæsthesia, and hemiopia of the left fields. The defects were almost symmetrical in the two eyes, and were peculiar inasmuch as they did not involve exactly the left halves, but encroached above slightly on the right halves, and below left a part of each left half free. The optic discs presented slightly undersized arteries, but no other abnormality. On re-examination seven months after the attack, the visual defect and ophthalmoscopic conditions were unaltered, except that some peripheral contraction of the fields had occurred; reaction of pupils normal to light and with convergence; hearing bad on the left side; taste and smell unaltered; speech and handwriting good; memory weaker than formerly. The patient had taken bromide and iodide of potassium; the attacks had recurred frequently in the interval, but there had been no further severe cerebral symptoms. The visual trouble differed from what it had previously been, in that the glimmering was now no longer perceived towards the left. Two near relatives of the patient were stated to suffer from migraine, and he himself was markedly anæmic, but beyond these predisposing conditions no cause was discoverable.

The most probable explanation of a permanent hemiopia following transient attacks of ophthalmic migraine is that the vascular spasm which causes the latter leads, in the cases in question, to a state of permanent thrombosis of the vessels supplying either the cortical centres for vision, or some portion of the visual apparatus deeper than the optic commissure. This has not as yet been proved by post-mortem examination, but, in support of the theory, we may refer to the undoubted occurrence of this same sequence of events in the retina, where thrombosis of the central artery, presenting ophthalmoscopic symptoms resembling those of embolism, sometimes terminates a long series of transient attacks of loss of sight. (*Vide* O. R., vol. III., p. 1). The possibility of such an event should, as the author points out, be regarded as an additional reason for avoiding all those exciting causes, such as excessive fatigue, loss of sleep, irregularity of meals, &c., which are known to induce attacks of migraine; it should also, to some extent, modify the favourable prognosis which is usually given in this affection.

RICHARD HILBERT. A Peculiar Symptom of Fatigue in the Visual Nervous System, and its Relation to Erythropsia. *Klin. Monatsbl. f. Augenheilk. November, 1884, p.* 403.

The observation recorded in this article is especially worthy of note because it was made by the writer, accurately and repeatedly, in his own person. After passing the half or the whole of a night without sleep, Hilbert perceived that in looking at a white surface the whole field of vision was subject to a rhythmical alternate brightening and obscuration, occurring synchronously with the pulse beat, the brightening with the systole, the obscuration with the diastole. The phenomenon resembled the effect produced by a lightning flash when the eyes are directed away from the point whence the flash proceeds. With closed eyes it was never perceptible. On looking at printed or written characters a second phenomenon presented itself; the individual letters appeared to lie in different planes, some in front others behind the level of the paper, and a given letter appeared to change its plane, being sometimes in front sometimes behind. The confusion thus produced was so great as to render it almost impossible to read or write. In walking along the street a similar confusion as to the level of the paving stones occurred, and the appearance was the same whether one eye was closed or both were open. It was found that this effect was closely simulated by making the attempt to blend two precisely identical pictures with the stereoscope, an experiment in which, as is well known, a true blending is unattainable, and which produces an uneven step-like appearance in the figures looked at.

Usually the phenomena ended here, but if the previous nervous exhaustion had been extreme a third was added. The interspaces between the stones of the pavement, presumably the darker portions of the object looked at, appeared red as though strewn with carmine powder. This appearance seemed to be independent of the direction and the intensity of the light, occurring both in bright sunshine and when the sky was clouded, and whether the light fell from in front or from the side. It occurred, however, only out of doors, and only in the particular circumstances mentioned. The whole group of symptoms always disappeared after the mid-day meal. The writer states that he is thirty years of age, healthy, moderately myopic, with normal acuity of vision, and does not usually wear correcting glasses. Insufficiency of the internal recti is not present, and could not in any case account even for the confusion in reading, as closure of one eye did not remove this symptom. The fundus of the eye examined by a colleague during an attack presented no abnormal appearance. The author regards the phenomena as symptoms of a hyperæsthetic state of the visual nervous system, and believes that the part affected is central, not peripheral, because the attacks were induced by general nervous exhaustion not involving any special fatigue of the eyes, and because the usual consequences of over-excitement of the retina, such as dazzling, muscæ volitantes, persistent after-images, etc., were not observed. The second phenomenon—pseudo-stereoscopic vision, as he terms it—he refers with certainty to central disturbance, for the reason that a retinal symptom of such a kind could not remain entirely unaffected by the alternate closure of either eye. It may, he suggests, be in some degree allied to the alleged monocular diplopia lately discussed in this country by the Ophthalmological Society. (*Vide* O. R., Vol. I., p. 17; Vol. III., pp. 185, 219, 224.)

Reviewing the various recorded cases of erythropsia, Hilbert concludes that this phenomenon is in all cases to be regarded as a sign of exhaustion, involving the central nervous visual apparatus, together with the rest of the nervous system, and produced by general causes of fatigue, such as violent mental excitement and bodily exertion, rather than as a retinal symptom. If it were a result simply of over-excitement of the retina, it should be met with as a consequence of dazzling in otherwise healthy eyes, and it should certainly occur after the long exclusion of light by the bandage or confinement in the dark room, which is not the case. In Meyerhausen's case of erythropsia, in which the red vision came on after the use of atropine, he would ascribe it to a central toxic action of the drug, rather than to the dilatation of the pupil, as it did not appear for some time after the application. In support of the same view he cites a case of Meyhofer's in which the red vision appeared after the performance of a preliminary iridectomy, together with intense mental excitement over the loss of the fellow eye through cataract extraction, and disappeared after the successful extraction of the cataract from the second eye.

In attempting, if we understand him rightly, to exclude the action of strong light from among the conditions which induce erythropsia, the author goes, we think, a step too far. To admit the agency of excessive light-stimulation is of course not to say that the red vision is a retinal symptom; an irritable centre would suffer under such stimulation no less than an irritable peripheral organ. It is clear from the circumstances under which it arose in his own case, and especially from the fact that it was banished by a meal, that general nervous exhaustion, independent of special use or exposure of the eyes, is a predisposing condition; but it is in the highest degree reasonable to suppose that in presence of such exhaustion of the central percipient organ, the influx of a stimulus from the retina, and especially of an unusual or excessive stimulus, is an auxiliary factor likely to call the symptom forth; that this actually is so becomes almost certain when we see that in nearly all cases the red vision arises under circumstances of special retinal illumination, *e.g.*, out of doors rather than in doors; never with closed eyes; on looking at white surfaces; under peculiar conditions of the pupil, as during atropine dilatation, or after iridectomy; after removal of an habitual obscuration, as after cataract extraction; and so on. The condition may, not improbably, be truly described as one of exhaustion and irritability of the percipient centres, in which the stimulus of light, especially if it be excessive or unwonted, calls forth abnormal sensations. Hilbert's experience shows clearly that the treatment of erythropsia should consist in the avoidance and correction of nerve exhaustion.

E. L. NICHOLS (Kansas). Sensitiveness of the Eye to Colours of a Low Degree of Saturation. *American Assoc. for Advancement of Science. Reported in New York Med. Journ., Sept.*, 1884, *p.* 323.

For the purpose of determining the minimum degree of saturation at which various pigments become perceptible, red lead, chromate of lead, chromic oxide, and ultramarine were each mixed with white, so as to form a series of compounds, in which the proportion of the pigment to white progressively diminished. The four series of mixtures thus formed were bottled and labelled. They were mingled indiscriminately, and the ability of observers unacquainted with the code of labels to arrange the colours according to hue and shade was determined. Fifty-four persons of both sexes were tested in this manner, two sets of statistics were obtained. The first and most important dealt with the sensitiveness of the eye to the presence of small amounts of colouring matter in mixtures consisting mostly of white.

The amount necessary to impart a recognisable hue to a white powder was found to be almost incredibly small. It differed with the nature of the colouring matter and with the individual observer. Eight of the fifty-four observers (five males and three females) could detect three parts of yellow in one hundred million parts of white. Two observers (both females) could not perceive the colours in mixtures containing less than one hundred and ninety-eight in one hundred millions. The following table gives the average sensitiveness of the two sexes and of all the observers :

Number of Parts of Colouring Matter that must be mixed with One Hundred Million Parts of White to affect the Tint of the Compound.

	Red lead.	Lead chromate.	Chromic oxide.	Ultra-marine.
Average for 31 males......	15·9	17·3	817·7	148·5
Average for 23 females ..	39·8	33·2	913·6	108·1
Average for both sexes ...	25·2	23·9	864·3	126·5

Thus the male observers showed measurably greater sensitiveness to all colours excepting blue, and their superiority increased with the wave-length, being greatest for the red. Both sexes showed a marked deficiency in their power to detect the presence of green. For purposes of illustration merely, a place in the spectrum was assigned to each pigment by the author, and curves were drawn to show graphically the sensitiveness of the eye as a function of the wave-length and to exhibit the peculiarities of this function in each sex and in the case of certain individuals.

In the detection of shades of saturation, women showed a decided superiority in all parts of the spectrum, and both sexes were most successful with the colour (green) for which the eye had been found most deficient in sensitiveness.

This would seem to indicate that the power to perceive colours of very low saturation depends upon the delicacy of the eye, while the ability to detect differences of shade is the result of practice.

E. FUCHS (Liege). Inflammatory Glaucoma. *Von Græfe's Archiv., XXX., 3, p.* 123.

Glaucomatous eyes have but rarely gone to the anatomist until long after all sight had left them. Fuchs has been fortunate enough to obtain from the body of a woman aged 66 two eyes, both of which had been attacked by glaucoma, one at least having had fair sight at the time of death. They had been iridectomised with satisfactory result, seven and eight years respectively before the patient's death, for acute inflammatory glaucoma.

The eyeballs were alike in the following respects:—Cornea and iris normal (except for the colobomata). Angle of anterior chamber normal, rounded, not in the least contracted; Schlemm's canal normal. Ciliary body enlarged, both the muscle and the processes. Muscle resembling that in hypermetropia, though H was not present (antero-posterior axis 24 mm.); Müller's fibres very much displaced forwards. The ciliary processes much enlarged, but not at time of death (though possibly at period of acute glaucoma) in contact with iris. They rise suddenly up from flat portion of ciliary body as in case described by Weber. The iris has to bend forwards as it passes from its root in front of the disdented ciliary processes before it can assume its normal position, consequently a slight increase of ciliary body would be sufficient to jam iris against cornea, and swelling of iris root (as in mydriasis) would be able to effect the same.

The enlargement of the ciliary processes was such that they must have had at least double their normal surface, and there was great irregularity in the pigment layer, even at the hindermost portion of the ciliary body. Minute structure of ciliary body normal. Hyperplasia of ciliary muscle. Circulus art. irid. maj. and vessels of ciliary body normal, the lumen not enlarged, nor the wall of the vessel thinned. Fuchs consequently attributes these latter changes, on which Brailey has laid so much stress, to the effects of long-continued pressure.

Pigment epithelium over choroid normal, but the latter exhibiting signs of a slight inflammatory process not accompanied by any destruction of blood vessels.

The larger ciliary nerves normal. The white substance of many of the smaller ones enormously and irregularly swollen, and others in a state of atrophy consecutive upon similar swelling. These nerve changes were only in the right eye, and therefore are not connected with glaucoma. They resemble what Uhthoff has found in a case of traumatic iridocyclitis which led to sympathetic inflammation.

Retina normal except for cysts near the ora serrata. No atrophy discoverable in the layer of nerve fibres. Vitreous also normal.

Equatorial diameter of lens 8.23 mm., antero posterior 4.73 mm. The former below the average at age of 60, according to Priestley Smith and Brailey, who estimate it at 9.5 mm. The circumlental space considerably reduced, not from increase in the size of the lens, but from enlargement of the ciliary body. Indeed, this space was so small that it may be assumed that the lens had not been larger *ante mortem* than the above measurement, as otherwise marks of its contact with the ciliary processes must have been visible, and none such could be seen.

Lamina cribrosa convex backwards, but only to a slight extent. No change in the surface of the papilla. Optic nerve somewhat atrophied, especially on its periphery, only a few atrophic bundles visible at its centre. No cellular infiltration of the nerve, but some hypertrophy of the connective tissue best marked in the region of the macular fibres, as defined by Samelsohn, Nettleship, and Vossius. Fuchs calculates that about one-fourth of the nerve fibres had been destroyed.

Fuchs considers that the changes in the ciliary body were not inflammatory. No connective tissue hypertrophy was present, and, he thinks, a simple hyperplasia accounts for the appearances. This he believes to have existed before the glaucomatous attacks, and to have been the direct agent in their excitation.

M. W. V. Schulten (Helsingford). Experimental Investigations upon the Intraocular Circulation and its connection with the Intracranial Circulation. (Continuation.) *Von Graefe's Archiv.*, *XXX.*, 4, *p.* 61, 1884.

The Cerebral Circulation.—Prior to investigating the condition of the intracranial circulation Schultén attempted to ascertain the amount of elasticity possessed by the spinal dura mater, proceeding by a method similar to that by which he had demonstrated the elasticity of the sclerotic coat of the eyeball. His observations convinced him that the dura mater possesses a very considerable power of expansion for pressures varying between 5 and 120 mm. Hg., and that the increase of the contained volume does not stand in direct relation to the pressure.

He has not used the method of direct observation of the blood vessels in the pia mater introduced by Donders, who trephined the cranium and fixed a glass plate in the opening, this method being little adapted for experiments upon such small animals as rabbits. The study of the pulsatile movements of the brain Schultén has also omitted, as it affords no certain data for quantitative conclusions as to alterations in volume.

As Schultén considers that the best of the methods hitherto adopted for measuring the intracranial pressure are defective, inasmuch as for their success it is necessary for cerebro-spinal fluid to escape into the manometer, or the salt solution to enter the subdural cavity, he arranged his manometer as when experimenting upon the eyeball, in such a way as to avoid this error. The entrance was made, as proposed by Bergmann, through the ligamentum obturatorium atlantis, and in other experiments through an opening obtained by trephining the cranium over the cerebral hemisphere. He finds in rabbits an intracranial pressure varying from 4 to 8 mm. Hg., figures which correspond closely with those obtained by Bergmann and Koch. The pressure varies, as all experimentors have observed, with the pulse and respiration. He does not hold any one-sided theory as to the regulatory arrangements which preside over the intracranial pressure. He believes that the increased volume of blood thrown into the cerebral arteries during cardiac systole, by the higher intracranial pressure it occasions, drives the cerebro-spinal fluid more rapidly out through the lymphatics, the lymph spaces in the peripheral nerves, and possibly the sinus of the dura mater, as well as distending the dural sac. Hence the pressure soon falls to its former level.

The intracranial pressure is less than the intraocular, as might be conjectured considering that the latter has the extra function to perform of preserving the shape of the eyeball.

The intracranial pressure is increased when the blood pressure is increased by ligature of one or both external jugular veins, a result similar to that obtained by Jolly in dogs, and which might be inferred from the experiments of Cramer and others with regard to the effects of the same operation upon the intracranial circulation. A similar result follows delayed expiration, as Franck has already demonstrated. Diminished blood pressure lessens the intracranial pressure, as Cramer's and Jolly's experiments have also proved.

Increased vascular tone diminishes the intracranial pressure slightly; this is contrary to what was observed by Jolly, and further experiments are needed upon the point. Cessation of respiration produces at first increased intracranial pressure, and then a fall owing to the stimulation of the vasomotor centre.

Diminished vascular tone markedly increases the intracranial pressure, but Schultén finds no effect to follow from extirpation of the superior cervical ganglion or section of the sympathetic.

The effects of alterations in the cerebro-spinal fluid upon the intracranial pressure and circulation are reserved for a future paper, in which the effects of external pressure will also be considered.

Summary.—The quantity of blood in the cranium is directly related to the tension of the cerebral vessels, increasing and diminishing respectively as the latter falls and rises.

The cerebral vessels are governed by vasomotor nerves which probably partly run in the cervical sympathetic and are partly intracranial; their constriction lessens the quantity of the intracranial blood, though we do not know to what degree this influence overcomes the simultaneous increase in the general vascular pressure.

Temporary anæmia is followed by increase of the intracranial blood, due to the lessened tone, which is probably produced by the removal of the outer support to the vascular walls.

The effects of the removal of the influence of the vasomotor centre are unknown, and the presence of active vasodilator fibres in the brain is also unknown.

The cerebro-spinal fluid has no independent tension ; its tension depends upon the quantity of blood in the cranium, but pathological increase or diminution of the fluid influences the cerebral blood supply.

It may be remarked that the analogy between the cerebral and the intraocular circulation is almost complete. The only general distinction that may be noticed is that the vessels of the former are exposed to greater variations than those of the latter, in consequence of the lower pressure in the cranium, and the ease with which alterations are effected in the quantity of the cerebro-spinal fluid.

The connection between the Intraocular and the Cerebral Circulation.—Increased flow of blood to the brain cannot well occur without an increased flow to the eyeball, unless it be occasioned by diminished vascular tone, or general plethora, or what is commonly termed collateral hyperæmia. Its effects will be seen in higher eyeball tension, and dilatation of the intraocular vessels.

Passive cerebral hyperæmia from venous obstruction need have no effect upon the eyeball, as the ocular veins possess other ways of emptying themselves, but if the obstruction lies more centrally (in the thorax) the eyeball will suffer accordingly.

The eye will participate with the brain in the effects of diminished blood supply caused by pressure on one or both common carotids, weak cardiac action, or diminution in the amount of blood in the general system.

Vasomotor paralysis, or spasm of the cerebral vessels, may exist without the intraocular vessels being affected, unless the cause lie in the vasomotor centre or the cervical sympathetic. Division of the cervical sympathetic has of itself no effect upon the intraocular vessels, but vascular paralysis from a central lesion exhibits its effects both in the brain and in the eyeball.

Alterations in the quantity of the cerebro-spinal fluid have no considerable direct influence upon the eyeball, but it is probable that through the connection between the intravaginal spaces of the optic nerves and the meringeal cavities they do exert some influence. This Schultén proposes to investigate in a future paper.

Edgar A. Browne (Liverpool). A Point in the Treatment of Purulent Ophthalmia. *British Medical Journal, January*, 1885, *p.* 69.

For the purpose of effecting a more thorough cleansing of the upper *cul-de-sac* than is possible by ordinary means, the writer employs a lid-irrigator, by which a stream of water, pure or medicated, can be thrown into the sulcus for any length of time. The instrument resembles an ordinary lid-elevator rather deep in the claw, and made of hollow tube, pierced, where it passes beneath the lid, with six fine holes through which fluid issues as through a douche. It has a handle above, and behind, a curved nozzle, connected by means of an india-rubber tube six or seven feet long, with a reservoir, which may be hoisted by means of a cord passed over a picture nail or the curtain pole, so as to carry it to the greatest height the room will allow. A stop-cock or clip regulates the flow. For a first thorough cleansing an irrigation of at least fifteen minutes is recommended. The method is applicable especially to the gonorrhœal ophthalmia of adults. Having tried various disinfecting solutions, the writer inclines to trichlor-phenol combined with manganese instead of with calcium, the latter compound being unsuitable for eye work ; a two per cent. solution for a first application in cases of gonorrhœal ophthalmia ; a one per cent. solution, or even a weaker one, for ordinary use. He has usually applied it twice a day for fifteen minutes. It causes a good deal of smarting, which ceases when the flow is stopped. If it irritates the cheek, the skin should be protected with vaseline.

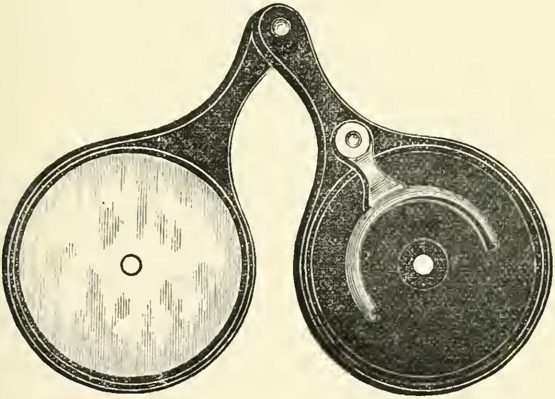
J. Albertotti (Turin). An Automatic Self-registering Perimeter. *Klin. Monatsblat., f. Augenheilk. December*, 1884, *p.* 465.

The special features of this new perimeter are that the circular method of mapping—that, namely, in which the test object traverses the field in concentric circles (*vide* O. R., vol. II., p. 370), is exclusively made use of, and that the arc can be rotated and the observations recorded on the chart by the person under examination. The arc is a semi-circle of metal, about two feet in diameter, rotating in the usual manner upon a horizontal axis carried by a vertical cast-iron pillar. The pillar is solidly fixed to a cast-iron slab which forms the base of the instrument. Beneath the base, and running from end to end, is a spindle carrying a hand-wheel at each end, so that it can be turned either by the patient as he sits facing the perimeter, or by the operator standing behind it. By means of cogwheels and a vertical rod running up the pillar this spindle rotates the arc; it also rotates two small horizontal discs which carry the charts. These lie within reach of the patient, and are marked by him by means of a pencil on a small lever. One turn of the hand wheel produces a half revolution of the arc, and a corresponding half revolution of the two charts, one of which is for each eye. The test object is carried in a clip sliding on the arc; at the termination of each revolution it is moved along the distance of one notch, and the pencil-lever is moved in like manner by hand, so that the two may stand at corresponding circles. The fixation for the patient's head includes a support for the chin, a second for the side of the head, and a third for the margin of the orbit. The axis on which the arc rotates is a tube open at both ends, so that the eye under examination may be accurately centred by looking at an object placed at a distance in line with the axis of the tube. A further provision for the accurate placing of the eye consists in two holes passing through the substance of the arc at equal distances on each side of its central point, and bored in such a manner that their axes point exactly to the centre of rotation of the eye. If, without movement of the head, the eye can look first through the tubular axis of the perimeter, and then through each of these tubular holes in the arc, it stands precisely in the centre of the arc's curvature.

For the circular method of perimetry, the mechanical arrangement of the instrument appears to be excellent. Our own experience of this method, which we have used a good deal, is that it is useful when it is desired to sweep the whole field for scotomata, and that in hemiopic and sector-like defects it is more accurate and convenient than the ordinary meridional method, but that there are very many cases in which the meridional method cannot be conveniently dispensed with.

A. H. Benson (Dublin). A Convenient Ophthalmoscope for Practitioners and Students. *British Medical Journal, Jan. 10th,* 1884, *p.* 68.

This instrument, designed especially to meet the wants of students, consists of two mirrors in a folding horn frame, the one concave for ordinary examinations, and provided with a clip to carry lenses, as in Liebreich's ophthalmoscope; the other plane for the shadow test. It is carried in a soft leather case, which has pockets for four small lenses, and for one large object lens two inches in diameter. The advantages claimed for it are: that it is simple, efficient and cheap—about five and sixpence, exclusive of the large lens, which costs two and sixpence. It is made by Prescott, of Merrion Row, Dublin.



R. Brudenell Carter (London). The Modern Operations for Cataract. *London: Macmillan & Co.,* 1884.

These lectures are probably well known to most of our readers. They are the Lettsomian lectures for 1884, delivered before the Medical Society of London, and published at the request of the Society. The first lecture traces the steps which have gradually led up to the improved and successful methods of operating now employed. The second deals with the "maturity" of cataract. the advantages and disadvantages of waiting for it, the conditions which justify early operation, and the methods of procedure. The final lecture is devoted chiefly to the risks which attend early operation, the use of anæsthetics, accidents, and complications. Points which we specially note are the author's profound disbelief in some of the published statistics of success in cataract operations; the high value which he attaches to a preliminary iridectomy in certain cases; his advocacy of the "A. C. E. mixture" (1. part by measure of absolute alcohol, 2. of chloroform, 3. of ether) as the best general anæsthetic for ophthalmic purposes; his routine use of eserine before extracting. The discourses are most interesting to read, being written throughout in the easy and graceful style for which the author is so well known.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, JANUARY 8TH, 1885.

T. SHADFORD WALKER, Vice-President, in the Chair.

Reported by DAWSON WILLIAMS, M.D.

Ophthalmia Neonatorum.—Dr. Brailey read a communication received from the Local Government Board, stating that the code of rules drawn up by the special committee of the Society, for the prevention of blindness from ophthalmia neonatorum, had been forwarded to the Registrar-General. A reply had been received from him, pointing out that the registrars of births could not be expected to perform extra duty without remuneration; a fee of twopence for each card read and presented would amount to a yearly expenditure of £7,300; in many cases it was not the mother of the child who registered the birth; and if instructions were given with regard to purulent ophthalmia, why should they not also be given with regard to other maladies? In his opinion, the scheme was impracticable. The Local Government Board added that the labours of the relieving officers were already sufficiently arduous.

The deputation which had waited on the Local Government Board were appointed a special committee to consider the communication, and to report.

Poisoning by Bisulphide of Carbon and Chloride of Sulphur.—Mr. Adams Frost read the report of the committee on this subject, signed by himself, Mr. Gunn, and Mr. Nettleship. The affection had long been recognised in France, and had been well described by Dr. A. Delpech, who grouped the symptoms into two stages, namely, a stage of excitement and a stage of depression. The affection had been described in this country by Dr. Alexander Bruce. Very few firms were engaged in the manufacture of India-rubber by Parkes' process, which was the one most liable to be followed by symptoms of ill-health. The methods by which danger might, in some degree, be obviated, were pointed out. Out of thirty-three recorded cases, in twenty-four there was some affection of vision. The prognosis appeared to be tolerably favourable, if the patient were able to give up his work soon after the first appearance of symptoms. Definite conclusions as to the length of exposure to the noxious influence necessary for the production of the symptoms could not be drawn ; slight symptoms, however, were often noticed a few days after commencing the work. The ambiyopia was never an isolated symptom, and never occurred without well marked general toxic symptoms. In most of the cases seen by oculists, changes were seen at the optic discs ; in the earlier stages, signs of chronic neuritis ; in the later, some degree of atrophy or pallor. In some, central defect of the field was found, but this had been carefully examined only in a very few instances. Several patients were noted as smokers, and a good many were stated to have been particularly temperate.

Cystic Tumour of Iris.—Mr. F. R. Cross (Bristol) showed a woman, aged 30, who presented a tumour of the size of a pea, protruding into the anterior chamber, and pushing up the iris to which it was attached. She had first noticed something wrong with her eye two years and nine months earlier, when, she believed, a foreign body was blown into her eye ; this was followed by some irritation of the eye, and a small spot was noticed. This spot enlarged, and attained the size of a pea, but after a year subsided to the size of a pin's head, and again enlarged to its present size.

Symmetrical Dislocation of Lens.—Mr. F. R. Cross showed a case of symmetrical congenital dislocation of the lens, upwards and inwards, in a girl, aged 8 years. Vision was very imperfect, but was improved by atropine and convex lenses.

Vision in Detachment of Retina.—Mr. Nettleship showed a patient with universal detachment of the retina from the edge of the optic disc forwards in all directions as far as could be seen. The greater part of the retina remained transparent; at the fovea centralis the retina was hypermetropic seven or eight dioptrics; the physiological pit of the optic disc was slightly myopic. The patient had good perception of light, and with + 8 D he could count fingers, and could see letters in 20 J. The vision and refraction of the right eye were normal. The patient was a teacher, aged 17; divergent squint of the left eye had been noticed for about eight years, and about that time he had a blow on the head; there was no evidence beyond this to show when the detachment occurred.

Opaque Nerve-Fibres.—Mr. Hartridge showed a case and a drawing of opaque nerve-fibres encircling the disc, and extending outwardly a long way over the fundus, in the right eye only; the eye was myopic, about 16 D, and vision only amounted to hand-movements. On the left side vision was normal.

Hyphæma.—Dr. Brailey again showed the patient exhibited at the last meeting. She then had in the left eye hyphæma with varying tension and slight iritis, all these symptoms being of about three months' standing only. On December 15th, the iritis in the left became worse, and the anterior chamber deeper, till it became enormously deep, but quite symmetrically so. The aqueous humour was clear. There was a greyish hazy reflex from behind the pupil. On December 18th, the right eye had a slight attack of a similar nature; the anterior chamber became deeper, with ciliary injection. The existence of six marginal anterior synechiæ was revealed. In a week the right regained its former condition, but the left anterior chamber was still enormously deep. The questions arose: 1.—What was the nature of the uveitis? 2.—What was the cause of the increased depth of the anterior chamber and the varying tension?

Amaurosis after Blow.—Dr. Brailey showed a patient who had received a blow on the left eye with a nail five months ago. Since then, there had been diminished tension with defective vision. There were a small superficial corneal opacity, shallow anterior chamber, and a patch of slight opacity on the posterior surface of the lens; the tension was − 1; vision $\frac{6}{60}$.

The Action of Cocaine on the Eye.—Mr. Walter H. Jessop.—An eye under the influence of a local application of cocaine presents anæsthesia of the parts in intimate contact with the drug, enlargement of the palpebral fissure, mydriasis, loss of accommodation, constriction of the small peripheral vessels, flaccidity of the cornea, and slightly altered intra-ocular tension. The anæsthesia may be explained by palsy of the peripheral endings of the sensory nerves. The enlargement of the palpebral fissure is probably due to retraction, both of upper and lower lids, by the unstriped muscular fibres contained in them, probably through irritation of the sympathetic. The dilated pupil acts to light and to the movements of accommodation; and this, coupled with the actions of atropine, pilocarpine, and eserine on the mydriasis, proves its sympathetic origin. The paralysis of accommodation occurs chiefly at the period of greatest dilatation of the pupil, and disappears some time before the pupil regains its normal size. The small peripheral vessels are constricted, producing pallor of the conjunctiva, but this rarely occurs except in normal vessels, and does not last long, showing irritation of the vaso-constrictor filaments of the sympathetic. The flaccidity of the cornea is apparently accompanied by diminished tension in the anterior chamber, but, at the same time, a brief increase of tension may be noticed posteriorly.* The circulation and sensibility of the retina are not affected by conjunctival instillation. The uses to which the drug may be put in ophthalmic practice are: (1) as a local anæsthetic in certain operations, in ulcers of the cornea, and other similar diseases; (2) as a mydriatic for ophthalmic purposes, and combined with atropine in iritis with synechiæ; (3) as a means of paralysing the accommodation in cases in which atropine or homatropine cannot be used. The salt used in the experiments made by Mr. Jessop was the hydrochlorate, in 24 or 20 per cent. solution, and it had been applied by conjunctival instillation, and injection beneath the skin, or fascia, or into the anterior chamber.

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* This statement must be received with reserve. Experiments which have not been controverted (*Glaucoma: its causes, pathology, &c., Churchill, 1879, p. 106*) have proved that a difference between the aqueous and vitreous pressures, of any amount discoverable by the finger or the tonometer, is a physical impossibility, for the partition which separates these two chambers is unable to maintain its position against any discoverable excess on either side. A very slight excess in the vitreous chamber is at once neutralised by an advance of the partition, and vice versa.—P. S.

Ophthalmoscopes.—Mr. Stanford Morton exhibited an improved student's ophthalmoscope, made for him by Messrs. Pickard and Curry, and combining various improvements at present existing in several instruments. For ordinary purposes, it has a single series of lenses, and four extra lenses easily adjustable for special purposes. The numbers of the lenses are fully exposed on a dial-plate, so that the position of any required lens is at once manifest; and the lens at the sight-hole is always indicated at the same aperture. There are two mirrors (one fixed at an angle), either of which can be instantly turned into position. The instrument is an inch and a quarter wide, and there is only one driving wheel, which, being three inches below the sight-hole, is not impeded in its action by the face of either patient or observer.

Mr. J. Couper showed a new refraction-ophthalmoscope, designed to overcome the objections which had been made against the instrument he had shown last year. In the new pattern, the index-wheel becomes the driving wheel (coarse adjustment). One revolution of it brings each of the seventy-two lenses in turn to the sight-hole, and a half turn suffices to go from the lowest to the highest lens of each series. Even with this wheel, the lenses are readily centred at the sight-hole. A fine adjustment-wheel is added, however, to give a slower and lighter movement. Only one figure at a time appears at the aperture of the shutter, and the latter follows the movements of the mirror automatically; a false reading thus becomes impossible. For those who were satisfied with fewer than seventy-two lenses, a thirty-six-lens instrument has been provided.

Mr. R. Marcus Gunn showed a new ophthalmoscope, with a thumb-movement of the discs and a strong flat handle. The flat handle is utilised as a pupillometer and a measuring scale.

At the end is an aperture useful in testing for central colour-scotoma. The thumb-movement gives increased steadiness and uniformity.

Mr. Wm. Lang showed a modification of Purves's original instrument, made by Messrs. Ferrier and Watson. Two discs carrying the lenses are moved by milled wheels conveniently placed; by a simple combination, it produces from – 1 to – 29 and from + 1 to 29. He also showed a pupillometer consisting of a plate fixed at the back of an ordinary retinoscopy-mirror.

Mr. Couper doubted the desirability of having two mirrors attached to an ophthalmoscope, and preferred a very small sight-hole, and a mirror of long focal distance.

Mr. Stanford Morton thought the best illumination was obtained with a mirror of nine or ten inches focal length.

Mr. G. L. Johnson preferred a focal length of four or five inches, which gives, in his opinion, a better illumination, and a not very small sight-hole.

Ciliary Nerves in Sympathetic Disease.—Dr. Brailey exhibited microscopic specimens showing the condition of the ciliary nerves in a case of sympathetic disease. The right eye had been operated on for cataract eleven months before the eye was excised. Four months later, opaque membrane was needled. Five months later (two months before the eye was excised), the left eye was found to be quite blind from iritis, presumably sympathetic. The long ciliary nerve and artery were perfectly normal. Specimens were also shown from an eye which had been excised on account of exciting sympathetic uveitis. The long ciliary nerve and artery were normal.

Ciliary Nerves in Uveitis.—Dr. Brailey also exhibited specimens showing an exceptional condition of the ciliary nerves in three cases of uveitis. There was inflammation around the internal long ciliary artery, extending into the contiguous portion of the corresponding long ciliary nerve. The eye was excised on account of iritis with recurring tension, one month after extraction of cataract from a glaucomatous eye. The other eye showed very doubtful sympathetic inflammation. Similar specimens were also shown from a case of iritis following iridectomy, but the inflammation was less severe; the other was in a condition of sympathetic irritation. A third specimen showed severe neuritis of the long internal ciliary nerve in an eye excised on account of severe irido-choroiditis of spontaneous origin.

Tubercular Disease.—Mr. W. H. Jessop showed microscopic preparations of an eye in which tuberculosis had been artificially produced by injection of tubercular virus into the anterior chamber. Groups of the bacillus of tubercle could be seen in the preparation. He also showed a pure cultivation of tubercle-bacilli in serum.

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NOTES ON TWO CASES OF SYMPATHETIC OPHTHALMITIS.

By Edgar A. Browne,

Surgeon to the Liverpool Eye and Ear Infirmary.

Our knowledge of sympathetic disease is still in a very rudimentary state. It is impossible to follow a discussion without noticing that there is a more decided difference of opinion upon fundamental questions than on most subjects connected with practical eye-work. Evidence accumulates, but at present it tends rather towards confusion than to simplification. Individual impressions still abound, a sure sign of imperfect knowledge. In the progress from chaos to order, individual impressions have a certain value in marking the lines on which evidence must be collected. They do not imply imperfect knowledge so much as insufficiency of data. One great difficulty in the way of accurately collecting data lies in the fact that a great number of the severest cases are not seen by ophthalmic surgeons till the processes are accomplished. In large towns, cases of severe wounds are seen, as a matter of course, at special hospitals; and as enucleation is freely practised, the proportion of sympathetic disease is small. But in country places a destroyed eye is treated on general principles, and its fellow is only supposed to be showing a proper (and not a pathological) sympathy, till something like blindness is reached by reason of closed pupil or other mischance. But in the following case I had the opportunity of seeing the mischief actually arise:—

Case 1.—*Wound of cornea, sympathetic iritis and neuritis, excision, good recovery.* (Condensed from notes by Mr. C. Shears.)—A. M., aged 7, admitted to Liverpool Eye and Ear

Infirmary, August 7th, 1883. Was struck in left eye by latch of a door twelve hours before. Large wound entirely confined to cornea, extending obliquely across from above downwards rather to the inner side of the vertical meridian. Small prolapse of iris, anterior chamber full of blood. V. Right eye $= \frac{20}{20}$ Left eye $=$ PL. The iris formed an adhesion to the wound, but the eye healed without signs of irritation; discharged September 8th.

Four days later (September 12th) re-admitted, the left eye being a little painful, V. = fingers. September 18th, right eye irritable. When the pupil was dilated with atropine, two slender synechiæ were seen extending from the upper margin of the iris and the lens-capsule. O.D. hyperæmic V. $= \frac{20}{30}$. No dots were noticed on the cornea. The left eye was enucleated.

September 27th, pain and ciliary congestion of right eye disappeared. As I consider darkness an essential to the treatment of these cases, no examination of the eye was made; the pad was only lifted sufficiently to admit the atropine up to October 19th, when well marked optic neuritis was noted. This subsided gradually, V. improving from $\frac{20}{50}$ to $\frac{20}{30}$. The child was discharged November 23rd, and O.D. had become normal by December 11th. I do not know whether at any time there were any dots, as I was careful to restrict the examinations as much as possible. The eye continued irritated and liable to slight conjunctival injection on slight provocation for some months.

This case is of the kind that has sometimes been relied upon as supporting the view that sympathetic disease is established by direct continuity from the injured to the sympathising eye by the path of the optic nerves. The opinions of many, indeed, seem to lean towards that view. Current pathology demands a bacteria-hunt in every inflammation, and as the optic nerve is the most direct course for transmission of septic organisms, a mental bias has been established that tends to give a favourable reception to evidence not altogether convincing in the absence of previous inclination to be convinced. Experiments may show (what is already an accepted anatomical fact) that there is a close connection between the two eyes by means of the optic nerves, but the clinical evidence scarcely points with equal steadiness in the direction of this anatomical short-cut. Some portion of the uveal tract is the seat of the *chief* mischief in all cases where the symptoms can be *seen*.

Clinically one is inclined to consider sympathetic cases as ranging under four classes. (1) Sympathetic irritation. (2) Serous iritis (including serous choroiditis), characterised by deep anterior chamber, dots on cornea, fine opacities in vitreous, papillitis, pupillary adhesions few or none, always fine and ductile. Complete recovery possible. (3) Plastic iritis (including cyclitis), giving rise to closed pupil and false membranes. Remediable by operation. (4) Malignant uveitis, involving the whole vascular tract, and giving rise to dense inelastic membrane behind the lens as well as destroying iris and pupil. These groups fade into one another by imperceptible degrees. But (excepting irritation as sometimes merely a premonitory condition) my impression is that individual cases have their character pretty well determined from the first.

Taking the most typical cases as guides, the facts that seem to stand out clearest amidst much confusion are (1) that the injury above all others most likely to induce sympathetic mischief is one involving the motor portion of the uveal tract or the nerves belonging thereto; (2) that the main stress of the induced mischief falls on the same tract in the other eye.

These tracts are precisely those which are in most intimate conjugate relation. The centres for accommodation, for pupillary contraction (accommodative and reflex) are inseparately associated. The fact that light falling on a sound retina causes contraction of the pupil in an eye whose retina (say from embolism) is incapable of directly reacting to its stimulus, indicates that irritation of any kind being propagated upwards to the centres of one eyeball is certain to be felt in the conjugate centres belonging to the other. Conjunction of physiological function certainly implies intimate trophic relationship and vasomotor interdependence. Injury and irritation at the periphery cause a greater or less degree of instability at the centres, and the conjugate centres being necessarily implicated, in their turn reflect the irritation to the region immediately under its governance. In the mildest degree this probably amounts to not more than vasomotor paresis (perhaps intermittent) giving rise to transient hyperæmia; in others the loss of inhibitory influence may be sufficient to cause fluid exudation, and, rising in severity, culminate in the production of soakage and cell infiltration.

It is not improbable that the establishment of inflammation at some distance from the position of primary disturbance through the medium of neurotic influence may be in accordance with a pathological law not limited in its application to the eyes, but more easily followed in them and more constant in its manifestation on account of the more intimate correlation between them than is obvious between other organs or nutritional tracts. Herpes, for instance, is an inflammation of a tract governed by a nerve, the result of inflammation of a spinal ganglion. It is essentially a reflected disorder of nutrition, the primary source of irritation being sometimes very remote from the ganglion and the tract of vesication.

If the foregoing rough sketch of the mode of transmission have in it the elements of truth, it will be evident that in at all events a certain proportion of cases, the lymphatic system of the optic nerve does not constitute the shortest path between the two eyes. Nor in cases like the one under consideration does the occurrence of papillitis in the sympathizing eye necessarily imply direct transmission. The cases in which it is most readily observed are those of the second group, in which the external signs of inflammation are less obvious and in which the media remain to some extent clear. The neuritis is therefore a prominent symptom and may be recognised before the less obvious signs of serous iritis are noticed. But the period of recognition does not necessarily correspond with the period of invasion. Bilateral descending neuritis is common. It does not tend to spread to the choroid, but follows the natural course and spreads on to the retina. On the other hand it is the tendency of uveitis to establish hyperæmia and papillitis of a low degree. These rules are not likely to be reversed in sympathetic disease, and as uveitis is the most constant symptom, we shall probably be right in looking on the papillitis as secondary.

Mr. Benson (O. R., Vol. II., 136) seems inclined to take an opposite view. He records a case in which papillitis was present in the sympathising eye without (at first) recognisable symptoms of uveal inflammation. But the sympathetic inflammation soon rendered observation of the papilla impossible by reason of lenticular opacity. The cornea and lens capsule were covered with minute spots of opacity, and iritis with synechia posterior were present; and in a case quoted from Dr. Fitzgerald, in which optic neuritis appeared six weeks after primary injury, but there was "some keratitis punctata also present when the neuritis was first observed."

CASE 2.—*Rupture of Globe; Primary Enucleation; Recurrent Iritis.* (Notes by Mr. C. Shears.)—J. S., 22, M. Left eye burst open by blow from a piece of iron, January 22, 1883. V=nil. January 23. Globe enucleated. The socket healed rapidly without discharge. He was allowed to wear a shell occasionally from a fortnight after the operation. On March 16 he complained that for the last two or three days he had suffered from pain in the right eye, mistiness of vision, and some circumorbital neuralgia. $V = \frac{20}{70}$. Circumcorneal injection; pupil did not dilate under atropine. In four days, after constant instillition of atropine, pupil dilated without synechiæ. May 8. Iritis disappeared. $V = \frac{20}{50}$ $H = +2 = \frac{20}{20}$. He was not seen again till December 2 (nearly seven months), when he again applied with iritis, of which he had been only conscious for one day, but which had to all appearances been longer in existence. Pericorneal injection, circumorbital pain, numerous posterior synechiæ, some uveal detachments on anterior lens capsule. By December 5 the pupil was fairly dilated but irregular. January 16, $V = \frac{20}{40}$ nearly, and on January 30 he was discharged. He was quite positive the eye had never inflamed before. Keratitis punctata was not demonstrated, but the cornea was spotted with fine white dots on its anterior surface, probably fine metallic dust, which would render the examination difficult. No sign of irritation of the socket was detected.

Concerning this case we may say with the impudent undergraduate to the examiner "it is easier to ask questions than to answer them." Was the inflammation sympathetic, or was it merely a coincidence? If sympathetic, was it due to the primary injury or to injury inflicted during enucleation? If sympathetic, was it due to actual irritation or merely to such loss of balance in trophic energy as might render the eye more than ordinarily liable to attacks from external influences? Was it due to irritation in the socket from cicatricial contractions or from the artificial eye?

The promptitude with which enucleation was performed scarcely allows us to consider the result as due to the primary injury—certainly not by direct continuity by any tract. But we may not unreasonably suppose that in the case of a smash or destructive inflammation the peripheral portions of the ciliary nerves may be injured sufficiently to cause an instability for a short distance, and that when such nerves are further injured by bruising by the scissors or by subsequent involvement in cicatricial contraction we may have the necessary conditions fulfilled.

Dr. Ayres (Cincinnati) has recorded an interesting case bearing on this point. The case was one of staphyloma, resulting from gonorrheal ophthalmia. The staphyloma was several times punctured for the relief of pain. Ten years afterwards the eye inflamed, and on the subsidence of this (six weeks) was enucleated, March, 1873.

In February, 1874, "She was admitted with well-marked symptoms of sympathetic disease." As pain was referred to the socket, Dr. Ayres operated to relieve tension from cicatrices and cut off a portion of the optic nerve. Recovery is noted as good (Archives Ophthalmology, Vol. XI.)

Mr. Nettleship has recorded two cases of his own, and one of Mr. Cowell's. 1. Fluid-shrunken cataract, with nebula result of ophthalmia neonatorum, extraction, intraocular hæmorrhage forty-eight hours after operation, enucleation ten days after operation, sympathetic disease thirty-two days after operation. Neuro-retinitis, irido-cyclitis, subsequent glaucoma and blindness. 2. Rupture of sclerotic, wound united by a suture. Eye inflamed, and was enucleated nineteen days after the accident. Forty-two days after the accident sympathetic mischief began. Acute iritis, detachment of retina, recovery in two months. 3. (Mr. Cowell's case.) Jagged wound near corneal margin with adhesions of iris, purulent cyclitis, enucleation twenty-four days after accident, sympathetic fifty days after the accident, iritis, fair recovery.

In all these cases we have conditions which might induce an instability a short distance outside the globe. 1. Degenerating tissues, punctures, inflammation. 2. Degenerating tissues, reaction from operation, &c. 3. Wound, suture. 4. Jagged wound, cyclitis. 5. (My own case.) Contusion. Given this amount of injury, it does seem to me possible that the usually innocuous proceeding of enucleation may have a determining influence for evil. In Dr. Ayres's case there was evidence of cicatricial involvement; in the others there was not. My own case may have been merely a coincidence; but I am rather inclined, speaking with all the reservation that a speculative view demands, to consider that the explanation that covers one of the cases covers all of them, and they are certainly not all coincidences. I am in considerable doubt about the case.

THE OPERATIVE TREATMENT OF ENTROPIUM AND TRICHIASIS.*

By John B. Story, F.R.C.S.I.,

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In a paper published in the Ophthalmic Review of February, 1883, I gave a description of the admirable operation proposed by Dianoux, of Nantes, for the cure of Trichiasis, and expressed my conviction that the operation thus described was, without exception, the best of all the then known methods of correcting the malposition of the ciliary border, and alleviating the unhappy condition to which the sufferers from trachoma (granular ophthalmia) are so frequently reduced.

While I have nothing to add to the description formerly given of Dianoux's operation, it is natural to expect that the experience of the past two years will have led me to modify in some degree the views which I held at a time when the operation was, in these countries at least, a complete novelty. At that time I had myself only observed the results of four operations, all perfectly successful, and although my subsequent experience contains an almost unbroken list of similarly perfect successes, it has compelled me to qualify and correct some important propositions which I hazarded upon the strength of the results in these first four cases.

I stated (*loco. cit.*) that the raw under surface of the ciliary flap is found after Dianoux's operation to adhere with great rapidity to the upper cutaneous surface of the skin flap which is pulled beneath it at its two extremities, so much so that after three days it becomes impossible to pass a probe between the two surfaces, and after a few weeks even, the detection of an operation cicatrix becomes a matter of extreme difficulty.

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* This paper was read before the Surgical Section of the Academy of Medicine in Ireland on February 20th, 1885.

Even at the time I made this observation it was to me a very incomprehensible thing how the external cuticle could adhere in this firm union to the under surface of the ciliary flap, and I was not surprised when my friend Dr. Arthur Benson informed me some time afterwards that he had been able, many weeks after a successful operation, to pass a probe along the submerged epithelial surface without resistance and without the appearance of any hæmorrhage to indicate the solution of vital union between the two surfaces. It was at that time his opinion that vital union never took place, and my subsequent observations render the truth of this opinion very highly probable. I have seen cases, one of which I have exhibited this evening, in which the little fistulous openings have remained unchanged for upwards of a year. It is, therefore, to my mind not at all improbable that the reason I failed to detect any fistulous opening in my early cases was my delicacy in handling the probe. In every case when I have tried to insert such an instrument as a blunt-pointed pin, I have succeeded in doing so without producing either pain or hæmorrhage.

I have also seen reason to modify my views as to the non-irritating properties of the external cuticle when applied to the surface of the cornea, and as to the pseudo-mucous character that the skin so situated takes on. It is but rarely that the skin acts as an irritant, but I have in the past two years seen at least two cases in which the small hairs on the transplanted skin acted as a source of corneal irritation, and I have seen many cases in which the appearance of the skin remained after several months markedly distinct from that of the neighbouring conjunctiva. In three of these latter cases I observed fairly long cutaneous hairs, but they did not appear to cause any trouble in the corneal tissue.

The only serious objection, then, to Dianoux's operation consists in the presence of cutaneous hairs, which, as I have stated, occasionally act as mechanical irritants to the corneal tissue. After I became aware of this danger, I always made a careful examination of the palpebral skin before operating, and if I found any considerable quantity of hair in it, or found the hairs, though not numerous, well developed individually, I rejected Dianoux's for some one of the other numerous procedures which have been adopted to cure either entropium or trichiasis. While I was in this uncertain state I received from Dr. Van Millingen a report of his ophthalmic hospital at Constantinople, containing the description of a method of operating for trichiasis, which he had arrived at by modifying the well-known Arlt-Jæsche operation. This Report was published in 1881, some two years prior to my paper in the Ophthalmic Review, and a year prior to Dianoux's article in the Annales d'Oculistique. Van Millingen only applied his operation to cases of trichiasis without incurvation of the tarsus.

The modification consists in transplanting a small strip of skin, or still better, of rabbit's mucous membrane to the space between the cilia and the conjunctiva. This is done after the first act of the Arlt-Jæsche operation is completed, and the strip of skin or membrane is left in its new position without applying any sutures; it may be covered with a piece of goldbeater's skin, and secured with a bandage. It is well, Van Millingen writes, to effect a broad gap at the intermarginal space before transplanting the strip of skin, and this he does by drawing up the skin of the upper eyelid against the forehead by means of sutures. which may be allowed to remain in until the skin has taken, which generally occurs in twenty-four hours. Van Millingen takes the skin from the upper eyelid if the skin there is found to be hairless after examination with a magnifying glass—if not, he uses rabbit's mucous membrane; and had, in 1881, successfully used that from the under lip of rabbits for this purpose.

This modification, described by Van Millingen, it may be observed, contains two separate and distinct procedures—one the transplantation of palpebral skin (without pedicle), and the other the transplantation of rabbit's mucous membrane in a similar way.

The first of these procedures is only practically distinguished from Dianoux's method by the greater probability it unhapily offers for sloughing of the transplanted skin, and I have consequently never adopted it. Van Millingen is not the only oculist who has advocated a proceeding of this description. Dr. E. Jæsche proposed in the Klin. Monatsblatt. for January, 1881, to cover the raw surface beneath the ciliary flap with epithelium from the arm. Dr. Waldhauer also, at the Eisenach Meeting in 1882, advocated a somewhat similar method (*vide* O. R., vol. i., p. 412).

The second commends itself at once to every scientific surgeon as likely if successful to produce a more perfect result than any other method that has yet been practised in this country, but to carry it out as described by Van Millingen entails all the trouble and annoyance of procuring a license under the Vivisection Act, and exposing both the hospital and the surgeon to the odium that would be excited thereby among a large section of the benevolent public. No doubt the end could be equally well attained by first slaughtering the unhappy rodent, which would render any actual vivisection unnecessary, but not to mention the utterly needless cruelty involved, it seems a somewhat extravagant proceeding to sacrifice a whole rabbit for the sake of a few millimetres of, to it, perfectly superfluous epithelium.

A far more important consideration, however, must occur to anyone who devotes any thought to the objects to be attained by the operation. If rabbits' mucous membrane can attain these objects, will not human mucous membrane do so in a still higher degree? The objects are to afford support to the ciliary border and so prevent its reinversion, and to do that by a tissue which will produce no more corneal irritation than would be produced by the healthy palpebral conjunctiva. Now we have in the buccal mucous membrane a tissue which is eminently adapted for fulfilling these proposed ends, and I have accordingly taken my strip of mucous membrane from the patient's own under lip, and can now, after some ten months' experience, confidently recommend this procedure to any surgeon who desires to please both himself and his patients by trichiasis or entropium operations.

I have notes of nineteen cases performed in St. Mark's Ophthalmic Hospital since April 23rd, 1884, of which at least eight were done by myself, the others being either by Mr. Arthur Benson or the resident surgeon. All these operations were successful so far as a cure of the deformity is concerned, even including one in which nearly the whole of the strip of mucous membrane sloughed ; but it is probable that in this latter case a relapse will occur sooner or later, necessitating the performance of a secondary operation.

The operation, as I now perform it, is as follows. It is done with or without the inhalation of an anæsthetic, at the option of the patient :—

Knapp's speculum being applied to the upper lid to prevent hæmorrhage, the intermarginal incision of Flarer is made from end to end of the lid, and the tissue of the orbicularis, &c., is freely dissected up off the tarsus. The lid clamp is then removed, in order to allow of the restoration of vascular tone and permanent stoppage of bleeding before the strip of mucous membrane is transplanted upon the space left bare beneath the ciliary margin. The clamp is in the meantime applied to the lower lip of the patient so as to restrain bleeding, while a thin strip of mucous membrane is dissected off the buccal surface. The strip should be of the length of the intermarginal incision, or slightly longer, and of a breadth of from 2 to 4 mm., according to the necessities of the case. Care should be taken to remove all the fat from the mucous membrane before fixing it in its new situation, and a useful plan to prevent much—or any—fat adhering to it as it is raised from the submucous tissue is to effect this dissection in a partial manner by a succession of transfixions by means of an ordinary iridectomy knife, this being done before the end of the strip is taken up in a forceps and lifted up bodily from its attachments. For this suggestion, as well as for the application of Knapp's speculum to the under lip, I am indebted to my friend Dr. Arthur Benson. All remaining fat being carefully removed from the little strip of mucous membrane, it is then attached by means of a suture at each end (and occasionally a suture at its centre) to the ends of the intermarginal incision ; the buccal bleeding is controlled by a few minutes' application of pressure.

The only drawback to the method of dissecting the strip of mucous membrane by transfixion is that occasionally the whole band may be cut in two from awkwardness on the part of the surgeon or the patient. If this occurs an additional suture is necessary, but the effect of the operation is not in the least lessened by such an accident.

The operation which I have described differs but in the smallest degree from that advocated by Van Millingen in the report quoted above. Indeed, it is hard to imagine how the idea of taking mucous membrane from the patient's mouth could have failed to present itself to the Constantinople oculist when he travelled in search of epithelium from the eyelid of a man to the under lip of a rabbit. I was accordingly not at all surprised to find in the Report of Van Millingen's Hospital for 1882 that he had himself practised and advocated this very proceeding before it had occurred to me.*

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* Dr. Van Milligen's Report was published last year, and I received a copy through his kindness in January this year, 1885.

The only points worth noting that differ in the operation as practised at St. Mark's Ophthalmic Hospital from the method originally proposed by Van Millingen are that the palpebral skin is not drawn up to the forehead by sutures; that, on the other hand, sutures are used to fix the strip of mucous membrane in its new situation, and that the operation is used for the cure of entropium proper (when the tarsus is curved in upon itself), as well as of trichiasis, to which cases its use is absolutely restricted by Van Millingen. I have never yet seen any necessity for raising the palpebral skin by attaching it to the forehead. Indeed, if sutures are to be employed elsewhere than in the transplanted mucous membrane, my inclination would be to use them to draw the tarsus down, by attaching it to the lower lid, rather than to draw the skin up. Sutures seem to me, however, necessary in order to fix the little strip of mucous membrane in its place. It might, no doubt, lie steadily without their presence, but it is decidedly better to employ them and obviate the risk of the tiny strip of tissue being disarranged by some casual movement of the patient.

For cases of incurvation of the tarsus, Van Millingen employs Streatfeild's operation, or some modification thereof. Now this grooving of the tarsus has always seemed to me a piece of unnecessary surgery. If there were no hairs at the ciliary margin to rub upon the corneal epithelium it would not matter to anyone how much incurved his tarsus happened to be, provided always that the closure of the lids were not interfered with. If this view be correct, it is manifest that Van Millingen's operation should be applicable equally to cases of entropium and trichiasis, and my experience has fully borne this out. In eleven out of the nineteen cases successfully operated on in the last ten or eleven months in St. Mark's Ophthalmic Hospital, the deformity was caused by actual incurvation of the tarsus. In five of these eleven cases I performed the operations myself, and as I have always held somewhat peculiar views upon this subject I have always been careful to note whether the tarsus was or was not incurved before operating. These five cases may, then, be regarded as test cases, and from them the conclusion may be drawn that the grooving of the tarsus is quite unnecessary for the cure of entropium caused by incurvation of the tarsus, the simple transplantation of a strip of mucous membrane into the intermarginal space being quite sufficient to effect a cure of this deformity as well as of trichiasis.

The operation here described conforms in all essentials to the requisites for a good operation which I laid down in 1883 (O. R., Feb., 1883). No skin or other tissue is unnecessarily removed, no cicatrices are left to subsequently alter the results, a firm support is given by the strip of mucous membrane to the ciliary border which effectually prevents its reinversion, and, lastly, no difficulty whatsoever is put in the way of the performance of any secondary operation in the improbable event of the first being unsuccessful.

In conclusion, I would lay stress upon the fact that the operation proposed is equally applicable to cases of pure entropium as to those of simple trichiasis.

ERNST FUCHS (Liege). The Causes and Prevention of Blindness. *Wiesbaden. J. F. Bergmann*, 1885.

At the fourth International Congress of Hygiene, held at Geneva in 1882, the English Society for the Prevention of Blindness announced, through its honorary secretary, Dr. M. Roth, of London, the offer of a prize of 2,000 francs for the best essay on the causes and prevention of blindness; the essays to be written in German, English, French, or Italian, and not previously published. In furtherance of the same object the International Society for the Improvement of the Condition of the Blind offered a second prize of 1,000 francs, and a third, with medal and diploma, for the essays next in order of merit. The following are the names of the jury appointed by the Geneva Congress :—H. Cohn, of Breslau ; Varrentrapp, of Frankfurt ; M. Roth and Streatfeild, of London; Fieuzal, of Paris; Layet, of Bordeaux ; Reymond, of Turin ; Sormani, of Pavia ; Snellen, of Utrecht ; Appia, of Geneva ; Dufour, of Lausanne ; Haltenhoff, of Geneva (hon. sec.) ; to these were subsequently added Berlin of Stuttgart and Courserrant of Paris.

Seven essays were received. The awards of the jury were announced by Dr. Haltenhoff, at the Fifth Congress of Hygiene, held at the Hague, in August, 1884. The first prize fell to Professor E. Fuchs, of Liège ; the second to Dr. Wilbrand, of Hamburg ; and the third to Dr. P. H. Mules, of Manchester.

Of the work now before us the jury spoke as follows :—" It is an original work of great merit, answering more completely than any of the others to the requirements laid down in the programme. Combining clinical experience with a complete knowledge of the literature of the subject, the author has considered all sides of the question with a thoroughness, exactness, and breadth of view which have struck all the members of the jury. Keeping constantly in mind the practical and philanthropic aim of the competition, and starting with a definition of blindness based on the social and economic position of the blind, the author succeeds in being complete and scientific, while he avoids superfluous statistics and considerations of pathology and therapeutics, which are outside his subject. His work presents a well-connected whole, of which each chapter may be profitably consulted by itself. The chief place is given, throughout, to the study of those preventive measures by which the number of incurably blind persons may be diminished. The jury feel it their duty to express the hope that this excellent work may soon be published, and if possible translated into other languages, either through the means of the English Society for the Prevention of Blindness, or in some other way."

Introduction.— Speaking scientifically, blindness is that condition in which objective sensations of light are not received, but from the practical standpoint a man is blind if his eyesight is so far incurably impaired that he is unable to follow any calling which requires the use of the eyes. Apart from cases in which the sufferer possesses special skill, or is able to obtain special instruction, such persons must depend on others for their maintenance. This definition excludes all cases of one-sided and all cases of curable blindness, even though persons belonging to the latter class do occasionally find their way into blind asylums. The best practical criterion of blindness is the ability or inability to go about without guidance in the daytime. The fact of a man's requiring a guide is always known to his neighbours; it is of importance in enquiries relating to blind persons and in the detection of imposition. When fingers cannot be counted at a distance of one metre self-guidance is in most cases hardly possible.

The causes of blindness, numerically considered, have not yet been determined on the basis of very large numbers. The statistics here cited comprise a table prepared by Seidelmann from the records of Cohn's clinique, embracing 1,000 cases and including one-sided blindness; and the graphic table of Magnus, founded on 2,528 cases of blindness in both eyes. The percentages in the latter are as follows:—

Congenital Blindness.

Anophthalmus and Microphthalmus	1·06
Megalophthalmus...	0·43
Cataract	0·11
Choroiditis	0·15
Atrophy of optic nerve	0·75
Retinitis pigmentosa	0·75
Anomalies of the cornea	0·07
Atrophy of the retina	0·19
Tumours	0·03
Undetermined causes	0·23

Blindness from Idiopathic Diseases of Eye.

Ophthalmia of newly-born infants	10·87
Trachoma and ophthalmia of adults	9·49
Diphtheritic conjunctivitis	0·35
Diseases of the cornea	8·06
Irido-choroiditis and cyclitis	8·86
Choroiditis of myopia	0·94
Choroditis of various forms	1·10
Retinitis pigmentosa	1·26

Retinitis apoplectica	0·11
Neuro-retinitis	0·79
Detachment of retina	4·74
Glaucoma	8·97
Atrophy of optic nerve—idiopathic	7·75
Tumours of the eye and its neighbourhood	0·35
Uncertain causes	3·36

Blindness from Injury.

Direct injuries of eye	4·03
Unsuccessful operations	1·93
Injuries of the head	0·27
Sympathetic ophthalmitis after injury	4·50

Blindness from General Disorders.

Syphilis	0·47
Gonorrhœal ophthalmia	0·91
Scrofula	0·03
Irido-choroiditis from meningitis	1·42
Atrophy of optic nerve from brain disease	6·96
,, ,, ,, ,, spinal disease	2·33
,, ,, ,, or neuritis after hæmatemesis	0·39
,, ,, ,, after vomiting, without blood	0·08
,, ,, ,, after hæmorrhoidal bleeding	0·04
,, ,, ,, erysipelas of the face	0·08
,, ,, ,, in insanity	0·04
,, ,, ,, in epilepsy	0·16
,, ,, ,, in dysentery	0·08
Albuminuric retinitis	0·19
Diseases of the heart	0·04
Parturition and pregnancy	0·43
Typhus	0·94
Measles	0·63
Scarlatina	0·51
Small-pox	2·21
Exanthemata of unknown nature	0·23
Toxic amaurosis	0·03
Diseases of the orbit	0·03

SECTION 1.—*Congenital and Hereditary Affections.* Disease of the eye present at birth is seldom of an active kind; it is usually the sequel of some fœtal disorder—corneal or lental

opacity, closed pupil, atrophy of the internal tunics or of the optic nerve, distension of the globe, or reduction of its size even to the extent of an apparent total absence. To what extent these malformations are due to fœtal inflammation or to arrest of development is at present uncertain.

Hereditary disease may be present at birth, or it may make its appearance later through latent predisposition. It usually occurs in similar or analogous forms in parents and offspring, but to this rule there are exceptions. Thus, a man blinded by ophthalmia neonatorum begot two microphthalmic children; in another instance the right eye of the father was lost in childhood through irido-cyclitis, and the same eye of his son was microphthalmic. These cannot be regarded as mere coincidences, for Deutchmann has obtained analogous results in an experimental manner in rabbits. Such hereditary transmission is chiefly to be feared when the disease of the parent was congenital or acquired in early life. There is no preventive treatment for such hereditary transmission, but it is sometimes the duty of the medical adviser to give a warning with regard to its possible occurrence. Among thirty-four children, the offspring of fourteen marriages in which one or both parties were blind from birth or childhood, Magnus found eight cases, *i.e.*, 23·5 per cent., of blindness or bad sight.

Among hereditary constitutional diseases which lead to blindness in the inheritors, scrofula, tuberculosis, syphilis, and lepra are the chief. Scrofula underlies a large proportion of the conjunctival and corneal diseases of childhood—those, namely, of the phlyctenular type. Tubercle in the parent often leads to scrofula in the child; thus, though actual tubercle in the eye is rare, eye diseases resulting from the diathesis are common.

Hereditary syphilis, as is well known, is a very fertile source of disease of the eyes. It is the duty of medical men to warn their syphilitic patients against marrying prematurely. Fournier lays down the following rules:—(1) So long as any local contagious manifestation persists marriage must be forbidden. (2) If the disease runs a favourable course, at least three years must elapse after the infection; if unfavourable, a longer period. (3) At least 1½ or two years must elapse since any fresh manifestation of syphilis has shown itself. (4) If the disease be of severe type, as evidenced by frequent recurrence of sequelæ, resistance to treatment, early visceral complications, great impairment of nutrition, and so forth, marriage must be postponed or permanently abandoned. (5) A thorough antisyphilitic treatment must in all cases be undergone previous to marriage. When active signs of syphilis present themselves during pregnancy, an energetic antisyphilitic course may be of great benefit to the health of the fœtus.

Lepra is often complicated with disease of the eye; in countries where it prevails it accounts for a considerable proportion of the cases of blindness. There is evidence to show its heredity.

Consanguinity of parents is a frequent cause of mental infirmity, deaf-mutism, and blindness, the latter chiefly through retinitis pigmentosa. Though this influence has been denied by some, a statistical enquiry shows that, so far at least as concerns retinitis pigmentosa, the affection is much more frequent amongst the children of near relatives than amongst others. Regarding as consanguineous, marriages between nephew and aunt, uncle and niece, and first cousins, and disregarding more distant relationships, the increased liability seems to be in the proportion of nearly thirty to one, but the calculation is not to be regarded as precise. The laws which from ancient times have prohibited marriages within certain lines of consanguinity have sprung, without doubt, from experience of the evil consequences which they have entailed. In Russia marriage is forbidden between relatives down to the seventh degree (second cousins once removed?); in Germany it is forbidden only between those who stand in direct line of descent and between brother and sister; in other European countries the law varies between these two extremes.

SECTION II.—*Diseases of Childhood.*—Of the purely local affections of the eye which arise in early life the most important are certain infective disorders—the ophthalmia of the newly born, and diptheritic ophthalmia—and traumatic affections. These will be considered later. Of the disorders which arise in connection with constitutional diseases the most important are those which are induced by scrofula.

Scrofula affects the eyes in several ways: Firstly, in the shape of the very common phlyctenular (pustular) conjunctivitis and keratitis, a disease which though it does not often lead to blindness causes a large amount of bad sight ; nearly all the corneal opacities met with in young people are due to scrofulous inflammation of the eye. Secondly, diseases of the deeper parts, iritis, iridocyclitis, and choroiditis; also, perhaps, one form of interestitial keratitis. Further, obstinate blepharitis with consequent mischief in cornea and conjunctiva. Lastly, caries of the orbital bones often leads to ectropion, and consequent damage to the cornea.

Apart from its effects upon the eye, scrofula is the cause of so many diseases and is so extremely wide-spread that it must be regarded as one of the worst enemies of mankind, and its removal as one of the grandest aims of philanthropy. The only efficient means to this end is the improvement of the condition of the lower orders, better food, healthier and less crowded dwellings, properly constructed workshops, and so forth. The treatment of scrofulous diseases of the eye demands, in addition to special local remedies, a persistent attention to the general constitutional state, and especially that the child should be placed, from time to time if not permanently, in thoroughly favourable hygienic conditions. To this end certain establishments called "holiday-colonies" (Ferien-colonien), of which the first was established by Pastor Bion in Zurich, in 1878, and in which weakly children are received for about a month during the school vacation, are springing into existence in Switzerland, Germany, Austria, and Italy, and with excellent effect. In Denmark the children are sent in twos or threes during the summer months to the dwellings of the ordinary country peasantry. This plan, though less satisfactory in some ways, has the great advantage of costing very much less money. During recent years no less than 7,000 children in Denmark have been sent into the country for the holiday months in this way. For children actually sick certain establishments on the sea-coast and at watering-places are of the highest value. The National Hospital at Margate, founded in the last century, is the oldest institution of the kind; it receives 700 children every year, The chief development of such maritime stations of late years has been in Italy, where at present no less than twenty are now at work during certain times of the year. It would be well for many of the children who are restored to health by these establishments to become agricultural labourers or sailors, rather than for them to return to their former unhealthy surroundings in the large towns.

As regards disease of the eye in children, no other constitutional disorder plays so important a part as scrofula.

Rickets is a cause of lamellar cataract.

Hereditary syphilis is not always easily distinguishable in its effects from scrofula ; fortunately the distinction is often not important, for tonic treatment is usually more beneficial to such children than a strictly antisyphilitic course.

General marasmus in children is sometimes associated with xerosis of the conjunctiva and suppuration of the cornea ; if the child does not die by reason of the marasmus, seriously damaged sight remains. In Germany such cases are uncommon ; in Russia they are met with at the periods of the great fasts, and many children die ; in Brazil the ill-nourished children of the negroes suffer in a similar way. Improvement of the general nutrition is the first essential of treatment ; locally warm fomentations are chiefly of use.

(To be continued.)

O. LANGE (St. Petersburg). The Diagnosis of Intra-ocular Sarcoma. *Klin. Monatsblätt. Nov.* 1884, *p.* 410.

The extreme difficulty in many cases of establishing the differential diagnosis between subretinal sarcomata and simple detachment of the retina has been impressed upon so many observers, that Lange's experience of the value of testing the translucency of the eyeball, in these doubtful cases, by transmitted light, is well worth recording.

The first case he experimented upon was that of a woman aged 45, whose lens had been successfully extracted for senile cataract. The results of the operation, both surgical and optical, were most satisfactory, but some seventeen months later she returned with a complaint of failing sight, due to a large detachment of the anterior nasal portion of the retina. The detachment exhibited two folds, of which the anterior was yellowish-grey, and the posterior dark-grey in colour. It was not moveable ; no abnormal vascular system was visible in the globe, nor any unusual vascularisation of the adjacent sclerotic; the anterior chamber was deep, the tension normal. Lange dilated the pupil, and concentrated the light of an ordinary gas lamp upon the sclerotic over the position of the detached retina, the eyeball being abducted ad maximum. By this procedure he was able to see not alone the detached retina, but, also, to a certain extent, the substance beneath it, which appeared to be a slightly turbid fluid, in which numerous larger and smaller dark bodies could be seen floating about. The diagnosis of tumour was accordingly negatived, and the patient was not seen for eight months afterwards, when she returned with her retina completely reapplied to the choroid, a normal field of vision, and an acuteness of vision equal to what she had after the original extraction ($V = \frac{1}{2}$) and before the detachment occurred.

Naturally, a suspicious detachment may be situated in a position where the translucency test is not applicable, but for a large number of doubtful cases this test will be found exceedingly useful. The case is also of exceeding interest from the observation of a complete spontaneous cure of a retinal detachment, an event which must be of extreme rarity.

O. HAAB (Zurich). Tuberculosis of Eyeball. *Klin. Monatsblätt. Nov.* 1884, *p.* 391.

Haab details the results of a recent microscopical examination of an eyeball he enucleated in 1880 from the orbit of a girl aged 13.

The patient came under observation eight days after the first symptom of an attack of iritis with haziness of the aqueous and pericorneal injection. The state of the fundus could not be ascertained. By degrees the tension rose, the membrane of descemet became clouded with exudation, hæmorrhages occurred in the iris, a yellowish reflex showed in the pupil behind the lens, and absolute amaurosis became evident. After enucleation the patient had a scrofulous abscess in the ball of her left thumb, but since then she has been and is still perfectly healthy. Her mother has died of a lung affection, and a brother of galloping consumption.

The lower half of the bulb was occupied by a tumour which had commenced to work its way through the sclerotic. The retina was completely detached above and in contact with the tumour below. In spite of the antiquity of the preparation, Haab has succeeded in demonstrating the presence of tubercle-bacilli by various methods—by that of Gram, by that of Ehrlich as given by Koch, and by Ehrlich's original fuchsin staining. Giant cells and caseation were also present, the latter to a high degree, and bacilli were found extensively in the caseated portions.

Haab has succeeded also in detecting tubercle-bacilli in a case of chronic tuberculosis of the choroid, an account of which he published in Graefe's Archives, 1879 (Die Tuberculose des Auges). The patient was a boy, aged 8½, and he died of cerebral tuberculosis one month after the euncleation. In spite of the preparation being almost seven years old, the bacilli were demonstrable.

Haab proceeded further to examine the eleven other cases, which were published in his paper on "Tuberculosis of the Eyeball," and had for this purpose only the microscopic preparations at his disposal. Nevertheless he succeeded in detecting tubercle-bacillus also in these old sections, though not in all the preparations.

These exceedingly interesting discoveries add highly to the value of Haab's original paper, and entitle us to assume that in future no case will be registered as tuberculosis of the choroid or any other portion of the eyeball, without the presence of bacilli being attested by suitable microscopical examination.

(On this point, however, compare the opposite experience of Mules, O. R., Jan., 1885, pp. 1, 6, 7.)

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(*Continued from page* 86.)

SECTION III. *Diseases of School Life.* — Myopia and Trachoma are the most important of the eye disorders acquired during this period. The present section is devoted entirely to the causes and prevention of myopia.

In a small proportion of cases myopia occurs as a *congenital* affection; this form usually attains a high degree in early life, is equally distributed throughout the different classes of society, and bears no special relation to the different kinds of occupation followed. Thus, Tscherning found very high myopia (greater than 9 D) to be at least as common among the lower orders as among the higher.

In the large majority of cases myopia is *acquired*, and among the various factors which combine to produce it the most important is prolonged use of the eyes on near objects. Children are rarely born myopic, and they rarely become so unless they use their eyes much on near objects; among uncivilised peoples myopia is as uncommon as it is everywhere among newly-born children. Among civilised peoples its frequency is in direct proportion to the amount of near work exacted of the young. In schools and colleges the frequency of myopia stands in direct relation to the grade of the school; thus, according to Cohn's statistics, in village schools it was present in only 1·4 per cent. of the scholars; in Universities, in 59 per cent. In a given school its frequency rises from class to class; thus, in twenty-four Classical Schools and High Schools it was found on the average in 15·5 per cent. in the lowest class, in 55·8 per cent. in the highest class. The average degree of the myopia increases with the frequency; thus, in the village schools the average degree was $M = \frac{1}{24}$, while in the Universities it was $M = \frac{1}{12}$. It is well established, therefore, that during the period of study a large number of originally emmetropic and hypermetropic eyes become myopic, and that among the myopes the degree of the myopia tends constantly to increase.

Seeing that under similar conditions of work certain children become myopic while others escape, the former must have some special personal predisposition. The causes of this latter are to be found in diminished acuity of vision from various causes, leading to undue approximation of the eyes to the work; in loss of equilibrium between the ocular muscles, and in inherited tendency. Sex exercises no decided influence as regards the liability to myopia; recent statistics on a large scale show, on the average, an equal prevalence among male and female scholars. Certain races appear to have a special liability to myopia; thus, in mixed schools where children of several nationalities work together under similar conditions, myopia has been found in largest proportion among the Germans and the Jews.

In estimating the gravity of the prevalence of myopia it is to be noted that in addition to the ordinary disabilities and inconveniences which attend it, myopia is the cause of about ten per cent. of all cases of blindness, *i.e.*, of such loss of sight as disables an eye for work. The immediate causes of such loss of sight are choroidal complications and detachment of the retina; this calculation includes one-sided blindness. Further, it is to be noted that highly myopic persons are more liable than others to injuries.

Prevention of Myopia. Regulations relating to Schools.—First in importance is the arrangement and lighting of the schoolroom. Insufficient light obliges the scholar to look too closely at his book, *i.e.*, it induces excessive accommodation and convergence. Various tests have been proposed by which to estimate the sufficiency of the light. Thus, some authorities measure the area of sky visible to the scholar, as he sits at his desk. This is not satisfactory, inasmuch as the actual amount of light falling on the desk depends on other factors as well, *viz.*, reflection from walls, etc., which cannot be estimated. Others estimate the sufficiency of the light by their own ability to see a given object at a given distance, *e.g.*, Snellen VI. at six metres. On this principle Landolt has constructed a "photometer," consisting of a group of black dots on a white ground. In a strong light, the dots are discernible at a distance of five metres, in a moderate light at three metres. The latter light may therefore be expressed as $\frac{3}{5}$. A mirror is attached in such a way that the test object, when laid upon a desk, may be viewed from any distance in a horizontal direction. Such tests are unsatisfactory, because the results vary with the visual acuity of the observer, and because there are very many persons who cannot put them in practice. A good and inexpensive photometer, suitable for the purpose in question, is much wanted. The only satisfactory one hitherto devised (by L. Weber, *vide* Cohn, *Deutsche Med. Wochenschr*, *No*. 38, 1884) is costly.

The following are the arrangements essential to good lighting:—The principal windows of the school-room should look to the east or south-east; a north aspect, except in hot climates, makes the room too chilly and dark; a south aspect too hot in summer. In England, however, cloudy and wet weather is so frequent that the latter aspect is on the whole desirable. The long axis of the room should run north and south or nearly so. Every scholar should from his place be able to see some portion of the sky. To this end the school-house must stand at a sufficient distance from neighbouring buildings; the height of the latter, according to angular measurement from the window-sill of the school-room, should not be more than 20—25°. Light from above is the best, and except in hot climates class roofs are very advantageous, but they are hardly attainable. The chief light must come from the scholar's left side. The height of the top of the window from the floor should not be less than $\frac{2}{3}$ the width of the room. The bottom of the window should be about one metre or a little more from the floor; if it be lower than this light meets the scholars' eyes from below and causes dazzling. The total window surface should bear to the area of the floor a proportion of at least 1 to 5. If the school-room be so broad that the foregoing requirements cannot be met by windows in one wall only, additional windows should be placed in the opposite side, or in the end wall behind the scholars. In all cases the chief light must come from the left side; it must not be overpowered by that coming in other directions. Light from in front is inadmissible.

In artificial lighting by gas, every burner must have a glass chimney and a shade, the latter arranged to reflect the light down upon the desk and to screen the scholars' eyes. There should be about one burner to every four scholars. An admirable illumination may be obtained by a special arrangement of the electric light. The lamp is suspended about half way between floor and ceiling, and beneath it is a concave mirror which screens the eyes of the scholars from all direct rays, and reflects the whole of the light against the white ceiling, whence it is diffused over the room.

A main cause of school myopia is the too close approximation of eye to book. The distance is determined by several factors, *viz.*, acuity of vision and refraction, illumination, size of the object, method of writing, construction of desks and benches, and position customarily adopted. With the exception of the first, these factors are all under our own control, and when suitable regulations are adopted the number of children who are really unable to see their work at a proper distance is very small. The right position is that in which the shoulders and pelvis are parallel with the edge of the desk, and the head upright or bent but slightly forwards. To this end a suitable desk and seat are absolutely essential.

The following are the principles on which the desks and seats must be constructed :—In every class the desks and seats must be of several sizes to suit scholars of various ages; the distance between seat and desk in the vertical direction must be but little greater than the distance between elbow and ischial tuberosity, *i.e.*, one-eighth of the height of the body; the horizontal distance must be negative, *i.e.*, the edge of the desk must overhang the seat about 5 cm., the scholar can then sit upright with his back supported while writing, and, as experience proves, will keep his eyes further from the book than if the seat be further from the desk; the desk must be arranged to fold or push back to facilitate standing up, the latter plan is preferable as it does not involve clearing the desk when the scholar stands; the height of the seat above the footboard must equal the length of the leg from knee to heel, *i.e.*, about two-sevenths of the total height of the body; the breadth must be one-fifth of the height of the body, *i.e.*, from 22 to 33 cm.; the width apportioned to each scholar should be not less than 64 cm.; the back-rest should reach only to the loins, and should be slightly curved to the shape of the back; the surface of the desk must slope, to obviate the bending forwards of the head and to give freedom to the movement of the arm in writing; the slope should be about 1 in 5, and adjustable to a greater angle to support the book in reading; the breadth of the desk should not be less than 40 cm.

The importance of a good position during study should be made known to the parents of the scholars so that these matters may be heeded at home as well as at school. The teacher may do this by word of mouth, or better by printed instructions, when the scholar is first admitted; the matter deserves especial care in cases of myopia. There are a few children who, in spite of careful attention to all the foregoing points, will habitually stoop closely over their work unless special measures to prevent it be adopted; for these some form of support to keep the head upright is required. The best, probably, is that of Kallmann, of Breslau, which consists of a metal ring, or loop, covered with india-rubber; the child's face looks through the loop, and his forehead rests against it.

The position of head and body while writing depends upon the style of writing taught. It has been proved that more than 90 per cent. of school children instinctively assume a position in which the base-line of the eyes, *i.e.*, an imaginary line joining the centres of rotation of the two eyes, is perpendicular to the down-strokes (O. R., Vol. II., p. 12). In this position the eyes accurately follow the movement of the pen during the making of the down-stroke, while in making the up-stroke they are fixed on the point to which the pen is to travel and do not accompany its movement. A correct position of the head, therefore, demands that the down-strokes shall be perpendicular to the edge of the desk. In accordance with this requirement the copybook may be placed square with desk and the writing be upright in relation to the lines of the book, or it may be placed obliquely, sloping upwards from left to right at an angle of from 30° to 40°, in which case the perpendicular strokes produce letters which slope in relation to the lines. The latter is probably to be preferred, inasmuch as the hand naturally moves in a direction upward towards the right, describing an arc of a circle around the fixed point where the arm rests on the table, while to write upright on lines which lie horizontally in front of the writer involves a succession of backward movements of the elbow. It is not certain that the special characters of German writing compel a closer approximation of eye and book, though this is asserted by some authors, but as a matter of international convenience the disuse of these characters is to be desired.

The legibility of type depends on several factors. A letter is legible, that is, it is recognisable as a particular letter, at a greater distance than that at which it becomes accurately visible. Its legibility depends chiefly on the heavy strokes, for it may be easily recognised at a distance at which the light strokes can only be guessed at. Broad letters are much more legible than narrow letters of the same height. The legibility of a letter is also much increased by the terminals (serifs) which complete the strokes; they serve especially to show the length and position of light strokes which would otherwise be hardly distinguishable. In the case of words or sentences it is still more evident that to be legible is not necessarily to be accurately visible; words are recognised where individual letters can not be entirely made out. This depends of course on practice. Children have, as a rule, a greater acuity of vision than adults, but in order to read easily they require larger retinal pictures of the letters than the latter, and therefore must have large type in their school books, or they will hold them too near to their eyes. The legibility of type depends also upon the distance between the individual letters, and between the lines, and upon the whiteness and the thickness of the paper. Cohn gives the following formulæ for the size and spacing of the type of school books, taking the n as the standard letter:— Height at least 1.5 mm., thickness at least 0.25 mm., space between letters at least 0.75 mm., space between lines at least 2.5 mm., length of line at most 100 mm., and number of letters in one line not more than 60.

Needlework taught in schools should be only of the simple kind useful in ordinary life; the finer kinds which require a close approximation of the eyes are injurious, especially to young children, and being required only in articles of luxury may properly be omitted.

The consideration of the hours of study in German schools, and the need of reform, need not be followed here; it is sufficient to note that the amount of school-work exacted is at present much greater than in England. An estimate of the number of hours spent by the scholar in study and in bodily exercise, from his tenth to his nineteenth year, in England, France, and Germany respectively, gives the following results :—

	Study.	Bodily Exercise.
England ...	16,500 ...	4,500.
France ...	19,000 ...	1,300.
Germany ...	20,000 ..	650

For the control of the various matters which influence the eyesight of school children, and for the detection of those cases in which myopia is actually present, systematic medical supervision of schools is urgently necessary. The provision of efficient control of this kind is difficult, for to be a thoroughly competent school inspector a medical man needs to have special knowledge of a kind which is not included in the ordinary curriculum of medical education; for example, amongst other things, he ought to be able to accurately estimate and deal with errors of refraction. For this purpose, therefore, and for others bearing on eyesight, the school inspector should, in towns where it is possible, have associated with him an ophthalmic specialist.

Among the many regulations necessary for the effective supervision of schools, the following are those which relate to the refraction of the eyes of the scholars :—

The Government should, under the advice of a competent commission, lay down certain standard regulations concerning school buildings and furniture, subjects, and methods of study, school books, and so forth. In all new schools the standards of construction should be absolutely followed, and all plans for the same should therefore be submitted for official inspection and sanction before they are carried into effect. For existing schools certain minimum requirements should be determined and rigidly enforced. All schools throughout the country should be inspected by the commission, and those which are found to fall short of the said minimum requirements should be either altered or closed at the discretion of the commission. The Government should appoint and remunerate medical inspectors for schools. In places where an ophthalmic specialist is to be found the examination of the eyes of the scholars should be entrusted to him. In all intermediate and high schools the refraction of every scholar should be tested and recorded at the beginning of each school year. It should be the duty of the inspector also to indicate the special placing in the class-room of such of the scholars as may require it on account of defects of sight; also, to prescribe glasses for such as need them, and no scholar should be permitted to wear glasses which have not been prescribed after proper medical examination. He should also indicate the cases in which certain subjects of study ought to be abandoned on account of defective sight, and communicate the necessary precautions to the parents of the scholar. The good results likely to spring from systematic medical inspection would be greatly promoted if all persons educated for teachers were duly instructed in the laws of health. Teacher and physician would then work harmoniously together, to the advantage of the scholars.

SECTION IV.—*Diseases of the Eye resulting from General Diseases.*—In *acute* febrile disorders the eyes suffer more frequently than is generally supposed. During the height of the illness the patient makes no complaint of his eyes, and attention is not directed to them until later, when the oculist sees the results of the mischief in the shape of corneal opacity, closed pupil, atrophy of the optic nerve, and so forth.

The cornea is the part most frequently affected. During severe illnesses, such as typhus, cholera, pyæmia, meningitis, and so forth, the patient often lies for days unconscious, with half-opened eyes, the lower third of the cornea being exposed and becoming coated with a dry film of secretion; beneath this the corneal tissue becomes dull, dry, and even ulcerated; and if the patient recovers from his malady, dense corneal opacities remain, even if the eyes are not lost. This so-called *keratitis xerotica* is essentially due to the exposure; in all cases, therefore, where such exposure is observed, the medical man should ensure a proper closure of the lids by bringing them together by small strips of English court plaister.

Abscess of the cornea—hypopyon-keratitis—occurs chiefly in connection with smallpox. It is a very severe affection, and is likely to lead to blindness. Before the introduction of vaccination variola was the cause of a large proportion of all cases of blindness, *e.g.*, thirty-five per cent., both in France and in Prussia, according to statistical records ; whereas, since vaccination has been made general, only seven per cent. and two per cent. in these countries respectively have been found to be attributable to this cause. Among 122 persons blinded by smallpox, Dumont found only one who had been vaccinated, and in that one it had been done unsuccessfully. This is a powerful argument for vaccination. In the treatment of persons suffering from smallpox, special attention should be paid to the eyes. The lids should be covered with pieces of linen smeared with boracic ointment to prevent their sticking together ; and at least once each day all discharges should be washed away from the conjunctiva with a disinfecting solution, the best for the purpose being corrosive sublimate, 1 to 5,000 of water. In case the cornea becomes affected energetic treatment must be at once adopted. An early application of the actual cautery in such cases may arrest the formation of a corneal abscess.

The acute exanthemata sometimes induce total necrosis of the cornea in young and weakly children, but this is more common in chronic forms of marasmus. Obstinate strumous inflammations of the eyes are a much commoner result of such diseases.

Disease of the uveal tract occurs in connection with all the acute infective disorders. Slight opacities in the vitreous would probably be often found during the period of convalescence if looked for, but serious damage to sight is uncommon. In recurrent fever inflammation of the iris and ciliary body has been met with in several epidemics, in from three to eleven per cent. of the cases. Cerebrospinal meningitis, sporadic as well as epidemic, is not seldom complicated with purulent irido-choroiditis which leads to destruction of the eye. The same affection may occur by metastasis in any case of purulent infection of the blood, and the original focus of suppuration need not be extensive, for metastatic choroiditis has been known to follow tooth-extraction. Its most frequent cause is the puerperal state, probably because of the large number of veins then exposed to the danger of purulent thrombosis. This pyæmic destruction of the eye is commoner than is usually supposed, for the patients generally die and the oculist is not likely to see them. In any case the eye is inevitably lost.

The optic nerve may suffer after acute febrile disorders, either by neuritis with consecutive atrophy or by atrophy without previous ophthalmoscopic change. The commonest cause of such mischief is meningitis, including epidemic cerebrospinal meningitis. Measles, scarlatina, dysentery, and typhus are sometimes complicated in the same way, but in these cases also meningitis is probably the usual cause. Erysipelas of the head is sometimes followed by neuritis; here the connecting link is either meningitis or cellulitis of the orbit. (*Vide* p. 105)

Among *chronic* constitutional diseases which cause blindness, syphilis, struma, rickets, and lepra have been already referred to. Leukæmia, pernicious anæmia, scurvy, albuminuria, diabetes, hysteria, chronic rheumatism, and gout are also causes of eye disorders and occasionally of blindness. In none of these conditions is there any prophylaxis special to the eye.

Among the chronic diseases of particular organs, those of the brain and spinal cord are the most productive of blindness. According to Magnus, about 7 per cent. of all cases of blindness arise from the former, and about 2·3 per cent. from the latter. About one-fourth of all cases of optic nerve atrophy depend, according to Leber, on tabes dorsalis. Chronic disease of the vascular system leads to blindness through embolism and thrombosis of the retinal vessels, through retinal hæmorrhage, and indirectly sometimes through hæmorrhage from other organs. In certain cases we have to assume, as the cause of loss of sight, nutritive disturbance, the nature of which is unknown, *e.g.*, in cases of blindness associated with pregnancy, parturition, and lactation, but not dependent on albuminuria or other demonstrable cause, senile cataract, glaucoma, and the chronic irido-choroiditis (iritis serosa) often met with in elderly people whose nutrition is depressed.

Toxic amaurosis, arising from excessive use of alcohol or tobacco, seldom amounts to blindness, but frequently incapacitates the sufferer from following his trade. Tobacco plays the larger part, but in most cases the two agents are concerned together. It is the nicotine in the tobacco which does the mischief. Nicotine volatilises at a temperature of 250C. and is decomposed, but in presence of watery vapour it volatilises without decomposition. In both respects the cheap tobaccos are more harmful than the better sorts, for they contain a larger proportion of nicotine, and they are moister. Chewing may produce similar toxic effects. The total amounts of tobacco consumed, if divided among the adult male population, would give—in Germany about ten to twelve grammes daily per head, in Great Britain about five grammes, in France and Austria about seven or seven and a-half grammes. (10 grammes=about $\frac{1}{3}$ ounce.)

A large consumption is necessary to produce tobacco amblyopia, but the amount differs much in different individuals. The affection depends much upon the kind of tobacco, the mode of smoking, individuality, and especially age. Hutchinson believes that total abstinence from alcohol increases the liability; on the other hand it is certain that excess of alcohol augments the mischief. The majority of the cases met with are in persons of more than forty years of age. Many smokers find that after this age they must reduce their daily allowance in order to avoid sleeplessness, loss of appetite, and depression. The poor suffer more frequently than the well-to-do, because they use the cheaper, stronger tobaccos, and because they are more careless about the first signs of tobacco poisoning. (Also, without doubt, because general exhaustion and malnutrition predispose to it. *Vide* Berry, O. R., vol. iii., p. 104.) A crusade against tobacco on the same lines as that waged against alcohol cannot be recommended, especially as it would get a very small following and produce little result. For the prevention of tobacco blindness, it is necessary to instruct the public concerning the danger. Also means should be systematically taken to have a portion of the nicotine removed from the stronger kinds of tobacco. This can be effected without destroying the aroma, and in those countries where a monopoly in tobacco yields a large revenue to the state the cost of the process should not stand in the way.

Alcohol in excess sometimes causes an amblyopia similar to that induced by tobacco. This only occurs when alcoholic drinks are taken in large quantities over long periods and when they contain fusel oil. It occurs therefore chiefly among spirit drinkers. The use of ardent spirits is found, in general, to be the greater the further we go north. In Holland, especially, it is extremely great. In the province of Gröningen the yearly consumption amounts to more than seventy litres for each adult male, and among the labourers in the dykes and marshes the allowance is reckoned at a litre per man per day. (1 litre = about 1¾ pints.) The cheapest spirits contain the most fusel oil, because potatoes are used in their production, and because little pains are bestowed on their purification.

In view of the wide-spread evil wrought by alcoholic excess, almost all countries legislate for its control, but with very various degrees of strictness. In Maine, North America, the liquor traffic is wholly forbidden, except for medical purposes. In Belgium, alone of all civilised countries in which spirits are drunk, nothing is done to limit the evil. The following are the lines on which good may chiefly be effected :—It should be the duty of the State to ensure the purity, *i.e.*, the freedom from fusel oil, of all spirit sold. The use of spirits should be checked by high duties, while the production of light alcoholic drinks such as beer and cider should be promoted. Licenses to sell drink should be limited by making them more expensive, and their number should be carefully proportioned to the demands of the community. Vending without license should be heavily punished. On the other hand, the establishment of comfortable refreshment rooms for the sale of tea, soup, cocoa, &c., should be as far as possible encouraged. All existing licensed houses should be strictly controlled by the police ; and the sale of impure liquor, or of any liquor to intoxicated persons, should involve heavy penalty or withdrawal of the license. Drunkenness in the street should involve fine or imprisonment ; a notorious drunkard should be treated as a squanderer (verschevender) and placed under restraint. Habitual drunkenness should be a ground for dissolution of marriage.

Chronic lead poisoning sometimes causes optic neuritis and consequent atrophy. These conditions are always preceded by other signs of lead poisoning. The lead enters the system either with articles of food or drink contaminated by being prepared or stored in leaden vessels, or through habitually working with paints or other substances containing lead ; the latter cases are the more frequent and the more severe. For the prevention of lead poisoning it is desirable that, as is already done in the case of some coloured paints, lead compounds should be replaced by other substances which are harmless. In lead manufacture of all kinds machine work should, as far as possible, take the place of hand work. Lead compounds should always, when possible, be worked in a moist state, so as to avoid contamination of the air with dust. For the same reason the workshops should be well ventilated, and the dust laid from time to time, if necessary, by a fine spray of water. Respirators over mouth and nose and gloves on the hands may be necessary for further protection; the workmen should take their meals in rooms not used for work, and should swill out the mouth and thoroughly wash hands and face before eating. Warm baths (especially sulphur baths) should be arranged for their frequent use, and those who are engaged in the more dangerous branches of the work should be frequently relieved by others. At the first sign of lead poisoning, work should be suspended, and medical treatment obtained forthwith.

(To be continued.)

KARL AUGUST (Frankfurt A.M.) The Etiology of Optic Atrophy after Facial Erysipelas. *Klin. Monatsbl., April*, 1884, p. 113.

A man, aged 36, lost the sight of his right eye from facial erysipelas, beginning at the tip of the nose, and spreading to the cheeks and eyelids on both sides. The left lids were the first affected, but this eye escaped. The right eye was amaurotic on the fourteenth day. At that time there was distinct thrombosis of the supraorbital and frontal vessels, exophthalmos, œdema of the lower fornix, and restriction of the movements of the globe. The erysipelas spread afterwards to the temporal and parietal regions of the right side, and produced numerous abscesses in these parts.

When August first saw the patient, the erysipelas was over, no appearance of the thrombosis remaining, but the right eye was still protruded, the lower fornix œdematous and bulging between the lids, the globe dislocated towards the temple, and restricted in its movements. No tenderness was found on pressure, but an even firm resistance was felt on palpating with the finger all round between the globe and the orbital edge. No fluctuation. Cornea clear. Semi-dilated pupil, V=O

The ophthalmoscopic appearances of the right eye were the following :—The edges of the disc distinct, the papilla not swollen, although it and the neighbouring retina were covered with a slight milky haze. No sign of atrophic discoloration of the papilla. Most of the blood vessels were either entirely invisible, or only incompletely differentiated from their surroundings. They were in parts filled with blood, and in parts transformed into glittering white lines. Two large veins were distinguishable. Their continuity was nowhere interrupted, and they were slightly tortuous. A small and contracted artery emerged from the disc between them. It was much more difficult to make out the nature of the other blood vessels, which exhibited many interruptions to their continuity, and were in many cases merely visible as bright white lines. Nothing abnormal was found in the macular region. Dr. Krüger examined the patient some fortnight or so before August saw him, and the note made was—"Arteries of papilla and retina quite empty, veins only filled in streaks, retina whitish grey."

Some two months later the smaller vascular twigs had disappeared, the larger vessels grown smaller, the papilla was beginning to display atrophic discoloration, the exophthalmos less, but the œdema of the lower fornix was unaltered. Three months later this œdema was much diminished, but in the fundus no change was seen except that the atrophy of the papilla was now well marked, and that a small skin-like process of a greyish-blue colour, and of a semi-transparent appearance, was visible on the temporal surface of the disc, from which it rose into the vitreous to about the distance of the diameter of the disc. It was plainly moveable in the vitreous.

August saw the patient again more than a year after the attack. The vessels were smaller still ; some had disappeared entirely. In the macular region there were irregular islands of dark-brown pigment, and some circumscribed white spots. The process running into the vitreous was unchanged. He considers this process to be the remnants of the hyaloid artery, and believes that it must have been overlooked in the earlier examinations.

It is probable that the infiltration of the orbital cellular tissue in this case depended upon an extension inwards of the thrombosis observed in the supraorbital and frontal vessels, as no pus was at any time demonstrable in these regions, and the ophthalmoscopic evidence is altogether in favour of the theory of obstruction to the supply of arterial blood. Neuritis is quite out of the question, and every classical sign of embolus was present, except, indeed, the cherry-red spot in the macula, which may have existed at a period antecedent to the first ophthalmoscopic examination. Venous thrombosis may have occurred almost simultaneously, but cannot have been the primary lesion; otherwise some of the effects observed by Michel must have been visible at the time of the first examination.

It is not improbable that arterial thrombosis may have been the cause of the atrophy in the cases observed by von Graefe (*Klin. Monatsbl.*, 1863, *p.* 58), for although he suggested neuritis as the origin of the atrophy, he stated that the neuritis seemed to pass very rapidly into this atrophy, so that after a few weeks the only trace of the supposed inflammation was to be found in the condition of the retinal vessels, and in a slight haze in the surrounding retina.

Two cases also examined soon after the onset of blindness by Pagenstecher (*Klin. Monatsbl.*, 1870, *p.* 207) are explicable on August's theory, for in the first of them there was no sign of a past neuritis, and in the second the papilla was sharply defined, and the principal abnormality was arterial constriction.

The arterial obstruction cannot, August holds, be produced by a simple pressure of the orbital soft parts, for in many cases the infiltration of the cellular tissue is very trifling; von Graefe himself also pointed out this fact.

The explanation to be adopted is that the micrococci found in erysipelas, as shown by Koch's researches, make their way into the orbital cellular tissue through the lymph paths, and so into the perivascular lymph spaces of the central vessels, when the unyielding nature of the surrounding tissue renders it easy for contraction of the vessels to be produced. We may suppose the process to be as follows :—First, disease of the coats of the vessel, then thrombus, possibly emboli in some of the branches and proliferation of the cocci along the vessels in the perivascular spaces leading to obliteration of different vascular districts.

H. Knapp (New York). Blindness from Thrombosis of Retinal Vessels in Facial Erysipelas. *Archiv. of Ophth., XIII.* 1. *p.* 83. *April*, 1884.

The author gives a systematic review of the more important cases of blindness after facial erysipelas already published, and adds an interesting case from his own practice.

Of the three classes into which Schwendt divides cases of blindness from erysipelas (1. Orbital cellulitis ; 2. Orbital cellulitis extending into the brain, and 3. Optic atrophy without orbital cellulitis, or exophthalmos), Knapp first deals with the third, and rejects Pagenstecher's two cases, and Hutchinson's one, as not affording proof of the absence of orbital cellulitis.

In all the other published cases he finds distinct evidence of orbital cellulitis.

The two cases of which Jaeger has published pictures are cited by Knapp in support of his theory.

Parinaud's two cases are also quoted, in the first of which the ocular defect did not appear till after the erysipelas was actually cured ; a peculiarity also present in the case published by Vossius and Jacobson.

Several fatal cases are described.—1. By Panas. Purulent meningitis was found post mortem. The central artery of the retina was obliterated, and the optic nerve transformed into proliferating connective tissue, evidently atrophy from neuritis, and not from pressure.—2. By Leber. Purulent orbital cellulitis, with purulent patches in orbital veins ; retina healthy.—3. By Poland. Semi-purulent orbital cellulitis ; ophthalmic veins filled with dirty pus.

In but few cases has an early ophthalmoscopic examination been made. The following details, however, are on record :—

1. Vossius and Jacobson. A moderate degree of neuroretinitis on third day.—2. Lubinski. A distinct picture of neuroretinitis passing into atrophy by way of so-called perivasculitis, with abolition of the calibre of the vessels in some places.—3. H. W. Williams. Optic nerve slightly altered, and retinal vessels lessened in size three weeks after commencement of erysipelas.—4. H. W. Williams. Faint yellowish-grey hue of fundus on second day of blindness, no swelling of papilla, a little diminution in calibre of vessels.—5. E. Nettleship. Four weeks after beginning of erysipelas, disc pale, arteries very small, veins diminished, pulsation of arteries on pressure.—6. A. H. Benson. Arteries small, pigment spots in macular region.—7. Coggin. Retinal vessels of one eye empty; those of the other also bloodless, except two; discs greyish white. Coggin ascribes the blindness to thrombosis.—8. Baumeister (reported by Hoesch). About the 10th day, a grey reflex from fundus, but no details visible. Later, a diffuse grey opacity in front of disc—possibly in vitreous—and peripheral retinal vessels filled with dark, almost black, blood. Subsequently, white atrophy of disc, with thread-like arteries and large dark veins, which gradually became interrupted by white bloodless segments the same size as the veins themselves, or even larger.—9. H. Knapp. Erysipelas in a man the subject of tertiary syphilis. Eyeballs protruded, immovable. Vision = 0. Four days after first complaint of defective sight, posterior portion of fundus milky white, neither disc nor macula visible. Very many dark, almost black, blood-vessels radiating from the invisible disc, some very large, all tortuous, and of the same colour. They tapered off towards the disc; towards the periphery were less thick and less black. These vessels never crossed each other, and pressure effected no change in their appearance. They were regarded as veins engorged with stagnant blood. Numerous dark-red, but not black-red, retinal hæmorrhages all over fundus. The condition of the second eye was the same. Two days later, small light-red arteries were visible between the large stagnant veins. The former emptied, but did not pulsate on pressure. Fresh hæmorrhages had occurred. Later on, white atrophy of the discs became visible, and the vessels acquired the perivascular white lines, and also became interrupted by white segments,

which Knapp characterises as "white thrombi." These gradually extended till the vessels, with a few exceptions, were totally transformed into white cords.

The isolated "white thrombi" are accounted for by the view that the stagnant blood only coagulates when the vascular epithelium becomes diseased and defective, and not till then does the organisation of the thrombus begin.

Knapp's general conclusion is that the intra-ocular changes are the result of compression of the central retinal vessels in the orbit, differing herein from August. Hæmorrhages have not been seen in any other case but Knapp's, but we cannot assume their existence, as he does, from the presence of pigment in the later stages, for August observed this pigmentation without pre-existing hæmorrhage.

Knapp advances the above mechanical explanation on account of its simplicity, but does not desire to exclude the action of thrombo-phlebitis in the orbit as the primary agent in causing the vascular stasis.

The mortality in the published cases is high, 29 per cent., and the prognosis as to sight is exceedingly bad; 16 per cent. of the survivors lost the sight of both eyes, and 60 per cent. of them lost the sight of one eye. Incomplete recovery of sight occurred in 12 per cent., and complete recovery in 12 per cent.

A. GRAEFE (Halle). Enucleation or Evisceration (Exenteratio) of the Bulb. *Abstracted in Centralblatt f. Prakt. Augenheilk., December*, 1884, *p.* 378. Evisceration of the Bulb. *Klin. Monatsbl. f. Augenheilk., January*, 1885, *p.* 49.

A notice of these communications will be read with interest in connection with the paper on the same subject, read by Dr. Mules at the last meeting of the Ophthalmological Society (*Vide p.* 118).

At the meeting of German "Naturforscher und Aerzte," at Magdeburg, in September, 1884, Graefe proposed the systematic adoption of the operation of evisceration in place of enucleation. His grounds for the proposal were: firstly, that enucleation is occasionally followed by death from meningitis, and that this danger would probably be avoided by the operation of evisceration, and secondly, that a better stump is formed for the reception of an artificial eye. The mode of procedure described was as follows:—The cornea together with a ring of the sclera from 1 to 2 mm. wide having been removed, the remainder of the globe is completely emptied of its contents by means of a broad bent scoop, so that only the cup formed by the sclera remains. This is then washed out with ice-cold solution of corrosive sublimate, and the conjunctiva is drawn together over it with gut sutures. A modification suggested by Bunge, for the better preservation of the contents of the globe for pathological examination, consisted in incising the sclera down to the ciliary body without cutting through the latter; the whole contents of the globe then come away with the anterior amputated portion of the tunics.

In the later communication Graefe replies to certain criticisms unfavourable to his proposal. He urges that the need for a safer operation than that of enucleation is real and not imaginary, and refers to cases of death by meningitis following the latter (*vide* O. R., Vol. III., p. 297, and Vol. IV., p. 39), the gravity of these disasters being all the greater because enucleation is not undertaken, except in the case of tumours of the eye, for the preservation of life, but for the avoidance of possible mischief in the fellow eye, or for the relief of intractable pain, or other ends not of a vital nature. He argues that on *a priori* grounds we are justified in the belief that the entire removal of the soft parts internal to the sclera will give as complete an immunity from sympathetic affections as the removal of the entire globe. With regard to the objection that the period of healing is longer after the new operation than after the old one, he states that in some cases primary union is obtained, and that then the patient can be discharged from hospital on from the third to the sixth day; that in others a considerable reaction, with swelling of the lids, chemosis, and discharge occurs, and that then the treatment extends to the end of the second week. Against this, however, he urges that enucleation is by no means always followed by quick convalescence, and, if undertaken in presence of panophthalmitis, is apt to be more tedious than that after evisceration. Finally, even though a somewhat longer convalescence should be the rule, he would not let this outweigh the advantages of the superior stump, and the supposed immunity from meningitis. Only if experience should show that evisceration gives no protection from sympathetic ophthalmitis or meningitis, would he allow that the disadvantages of enucleation must still be put up with.

Graefe has practised the operation with the best results in cases of the following kinds :—Advanced irido-cyclitis and the conditions which follow it ; in traumatic conditions of like nature ; in staphylomatous and glaucomatous states ; in one case of cysticercus ; in one of old hæmophthalmus, with calcification of the lens ; in tuberculous irido-cyclitis ; and in many cases of commencing or established panophthalmitis.

In December, 1884, appeared a paper by J. D. Dubanton, in Dutch, recording some experiments on this matter undertaken by the author at the suggestion of Dr. Mulder. He experimented first on the dead human subject to ascertain the best method of attaining the desired end, and then upon rabbits in order to observe the results produced. The conclusions suggested by this experimental study agreed with those of Graefe, arrived at in a different way ; they are that evisceration is likely to be as efficacious as enucleation as a safeguard against sympathetic troubles ; that it will prove safer as regards the danger of meningitis and may be performed in cases of panophthalmitis ; and that it will give a better stump for the artificial eye.

Without expressing any opinion as to the intrinsic merits of the new operation we would revert to a suggestion already made in these pages (Vol. IV., p. 39), namely, that the element of danger which attends enucleation might probably be banished almost entirely by a more systematic cleansing and disinfection of the wound than is customarily practised.

G. H. Burnham (Toronto). **The Use of Carbolic Acid in Purulent Affections of the Conjunctiva and Cornea.**—*Amer. Journ. of Ophth.*, *Nov.* 1884, *p.* 250.

In pursuance of successful experiments made by him at Moorfields (*vide* R.L.O.H. Reps, vol. X., *p.* 216), the writer has continued to treat purulent affections of the conjunctiva and cornea with carbolic acid lotion, and reports most favourably of the results. The condition in which he specially recommends it, and in which it has appeared to be more powerful for good than any other means of treatment, is that of suppurating ulceration of the cornea, such as occurs with gonorrhœal ophthalmia. The course pursued in the treatment of gonorrhœal ophthalmia is as follows:—The patient is ordered to bed, and a large basin of water with a lump of ice in it is placed at the bedside. The eye is bathed and carefully cleansed very frequently by the patient himself or by a nurse, and between times folds of linen, wet with iced water, are kept lying on the closed lids. Every hour the eye is bathed as thoroughly as possible with a 5 per cent. solution of carbolic acid, the lids being separated as widely as possible, the lotion applied very freely, and the patient told to turn his eye in all directions so as to bring all parts of the conjunctiva under its influence. A nurse is in constant attendance, and carries this out by day and night As the discharge becomes thinner a 2½ per cent. solution is gradually substituted for the stronger one. In view of this constant disinfection a watch-glass protector for the other eye is not employed; the patient is told to lie with the affected eye towards the pillow and is warned of the danger of inoculation.

In cases of suppuration of the cornea after cataract-extraction, the writer has used the same remedy with success, when other treatment seemed hopeless.

In cases of kerato-iritis, with extensive ulceration of the cornea, he has been equally fortunate.

In circumscribed purulent infiltration of the cornea leading to hypopyon before the occurrence of superficial ulceration, the carbolic acid is powerless, for it does not reach the seat of mischief.

It is essential that *pure* acid be used, otherwise much pain and irritation may be caused, and the results prove unsatisfactory.

J. Hirschberg (Berlin). Gonorrhœal Ophthalmia in Children. *Berl. Klin. Wochenschr.* 1884, *No.* 33.

The importance of all sincere attempts to trace diseases back to their causes justifies the publication of the six cases of gonorrhœal ophthalmia in children, reported by the author.

Case 1.—A girl, aged 6; acute purulent ophthalmia of both eyes. Acute purulent vaginitis.

Case 2.—A girl, aged 8; acute purulent ophthalmia of right eye. Purulent vaginitis.

Case 3.—A girl, aged 2; acute purulent ophthalmia, of a diphtheritic character, of left eye. Vaginal discharge.

Case 4.—A girl, aged 4; acute purulent ophthalmia of right eye. Purulent vaginitis in her own person and in her three sisters. The children's governess was discovered to have gonorrhœa.

Case 5.—A girl, aged 4; acute purulent ophthalmia of right eye. A three-year-old sister was stated to be suffering from a "scrofulous" (?) discharge from the vagina.

Case 6.—A boy, aged 7; acute purulent ophthalmia of right eye. A sister, aged about 8, was stated to have a "scrofulous" vaginal discharge.

It is noteworthy that only one boy appears among the six cases, and it is not improbable that he acquired the contagion from his sister. In all the cases the vaginal discharge was present before the outbreak of the ophthalmia. Hirschberg does not express any opinion as to the possibility of vaginal discharges produced by other causes than actual gonorrhœal contagion setting up acute purulent ophthalmia.

Clement Lucas (London). Gonorrhœal Rheumatism in an Infant; theResult of Purulent Ophthalmia. *Brit. Med. Journ., Feb. 28th,* 1885, *p.* 429.

A child, 18 days old, suffering from purulent ophthalmia, (for which it was being treated), came under the care of the writer at Guy's Hospital, on account of an affection of the joints. The mother stated that about a fortnight before delivery she became affected with a thick purulent discharge from the vagina. There could be little doubt that the child's eyes were inoculated during delivery. The mother had noticed that the child's left knee was enlarged, that the left hand dropped, and that it cried when these were touched or moved. On examination the left knee was swollen, with effusion into the joint, and there was also synovitis of the wrist, which was swollen, and creaked when moved.

If, as is generally supposed, the synovitis of gonorrhœa is the result of absorption of morbid material by the urethral mucous membrane, it seems likely that similar absorption may occur through the conjunctiva. The frequency of gonorrhœal rheumatism is small, as the writer points out, in comparison with that of gonorrhœa; it is possible that among large numbers of cases of purulent ophthalmia, a definite relation between this disease and joint affections might be found if looked for.

Mr. Hutchinson holds that gonorrhœal rheumatism occurs chiefly in the subjects of hereditary gout (O. R., Vol. III., p. 381); the point might be found to have some bearing on the class of cases here in question.

W. O. Maher (Sydney). A Method by which one can see the Shadows of one's own Retinal Vessels and Yellow Spot.—*Australian Medical Gazette, Nov.* 1884, *p.* 38.

Standing at a distance of from ten to twenty feet from a lighted gas-jet in a dark room, and covering one eye, the observer holds a strong convex lens at about its own focal distance in front of the other eye. Then steadily gazing at the light through the centre of the lens, he shakes the lens rapidly backwards and forwards along its own axis, or up or down, or from side to side. After a few seconds the shadow of the fovea centralis appears in the axis of vision, as a light yellow patch studded with dark coarse granules. Simultaneously the retinal vessels in the region of the yellow spot, including the finest capillaries, appear as dark cords against the yellow light. The shorter and more rapid the movements of the lens, the more distinctly are these appearances seen.

In Purkinje's experiment the eye is directed towards a dark background, and the light of a flame is focussed, by means of a lens, obliquely on the sclera immediately behind the sclero-corneal junction, or on the cornea itself. On rapidly moving the lens up or down, or from side to side, the retinal vessels are seen projected against the dark background. The shadow of the fovea centralis is faint and difficult to recognise by Purkinje's method, but by the one here described it is as clearly defined and as easily seen as that of the vessels.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, March 12th, 1885.

Jonathan Hutchinson, F.R.S., President, in the Chair.

Reported by Dawson Williams, M.D.

Prevention of Blindness from Ophthalmia Neonatorum.—The Special Committee, having considered the letter of the Registrar-General to the Local Government Board referred to them at the last meeting (*vide* O.R., vol. iv., *p.* 56), submitted the following report through their Honorary Secretary, Dr. Brailey :—" That, as in the opinion of the Registrar-General the reading over of a printed form by the Registrars of Births to the parents would entail a considerable expense, this may be dispensed with ; and that, in place of this reading, the following notice be printed on all official documents issued to parents in relation to the birth-registration and vaccination of children, namely : ' If the eyelids become red and swollen, or run with matter within a few days after birth, the child is to be taken, without a day's delay, to a medical man. The disease is very dangerous, and if not at once treated may destroy the sight of both eyes.' " The report was adopted, and a deputation appointed to wait upon the President of the Local Government Board.

Tuberculosis of Cornea and Iris.—Mr. Arthur Benson read a paper on a case of tuberculosis. The patient was a girl, aged

18, whose father had recently died of "decline," and whose sister was dying of the same. She had herself no physical signs of lung-disease, but had enlarged lymphatic glands under the jaw. Two months previously, the left eye, and six weeks later the right eye, became affected; greyish yellow nodules formed in the cornea and iris, and increased in number and size. They resembled exactly the appearances seen in cases of tubercle of the iris, and in rabbits whose anterior chamber had been inoculated with lupus. The left eye was enucleated, and microscopically examined. There were several nodules of a translucent grey colour in the substance of the cornea. They were situated external to the posterior elastic lamina, which, though extensively displaced and raised up by the masses, seemed to have resisted disintegration; the layer of endothelial cells on its aqueous surface remained intact. The neighbouring cornea was infiltrated, and its structure partly destroyed, the lamellæ being separated by masses of cell-growth. The nodules consisted of an agglomeration of round nucleated cells, in the centre of which a caseating area existed. Epitheloid cells were also abundant. In places, there was an appearance as if several masses of cells had coalesced; the peripheral portions of each mass stained much better than the central. No distinct giant cells had been found. The nodules on the iris seemed similar in structure. Examinations for specific bacilli yielded only negative results, but they had been only partially performed. The diagnosis was, so far, dependent upon the clinical history, the microscopic appearances, and the anatomical peculiarities of the growth, and must, therefore, be left open to the possibility of error. Two inoculation-experiments had failed to yield definite results. Sections of the growths, and of inoculation-growths, as well as drawings, were shown.

Mr. W. H. Jessop asked how soon after the inoculation the rabbits were killed; whether there was any tuberculosis of the lungs, and whether there were tubercles on the choroid. Mr. Watson Cheyne had found that, when inoculation was made into the anterior chamber in rabbits, the iris and choroid became infected, and subsequently general tuberculosis invariably occurred, whereas in general tuberculosis originating in other organs, the choroid escaped; he therefore inquired whether the patient now presented any symptoms of general tuberculosis. As Dr. Heneage Gibbes' method frequently failed in other hands it was important to know whether any other mode of staining had been used.

Mr. Nettleship asked whether the growths in the other eye had been scraped, and whether they had shrunk since the operation.

The President had seen several cases similar to Mr. Benson's in all points but one—the affection of the cornea; this was the peculiar feature of the case.

Mr. Benson said, in reply, that the first rabbit inoculated died after one week, the second after two months; in neither animal was there any tubercle in the internal organs. Dr. Heneage Gibbes' method was the only one used; the patient had enlargement of the cervical glands, but no other evidence of general tuberculosis. The other eye had not been operated on, but the growths had shrunk a little. The specimens were referred to a committee, consisting of Mr. Mules and Mr. Jessop, for report.

Evisceration of the Globe and Artificial Vitreous.—Dr. Mules read a paper on the preventive treatment of sympathetic ophthalmitis by evisceration of the globe, and the use of an artificial vitreous. A patient upon whom the operation had been performed six weeks earlier was present. In reviewing the history of the operation, he stated that Mulder and Gräefe were working out the same operation at the same time as he was himself without any previous interchange of ideas. (*Vide* p. 110.) He pointed to the result of this new operation as a further proof of the correctness of the views advocated by Snellen, Leber, Brailey, and Max Knies, that travelling organisms were the cause of sympathetic ophthalmitis. The operation which he performed was identical with that performed by Gräefe; but in addition to the operation of evisceration, Dr. Mules prepared the eviscerated globe for the application of an artificial eye, by the introduction of a hollow glass sphere or artificial vitreous, which was permanently retained; by this the shape of the globe was maintained and very good movement obtained. The results, therefore, were æsthetically good. The operation was performed as follows: The patient was anæsthetised, the hand-spray was used, and the appendages thoroughly cleansed and disinfected with solution of corrosive sublimate, 1 to 1,000; the front of the eye was transfixed, and removed with a sharp knife at the corneo-scleral junction. He considered it better not to cut the conjunctiva. The contents of the globe were then emptied out, in any way that was convenient, taking special care to remove the ciliary body and choroid, leaving only a clean white sclera. The sublimate solution was allowed to run into the eye through a thin india-rubber tube, used syphonwise, during the whole time the operation was in progress. The hand-spray was also used as an additional precaution, and its use continued till the bleeding nearly or quite ceased. The sclera was then slit between the inferior and internal recti muscles, until the glass sphere selected would enter the cavity. A catgut drain (to be removed next morning) was introduced into the lower angle of the wound, and the sclera was sewn up from above downwards. A layer of finely powdered iodoform was spread over the whole conjunctiva, and a dressing of wood-wool, in a double layer of Lister's gauze, was applied. As a precautionary measure, the patient was kept in bed for four or five days; the eye was dressed daily under the spray. If the wound was kept aseptic, the reaction was comparatively slight. If early suppuration ensued, the pain and distress were severe and prolonged. Too much stress could not be laid upon the necessity for antiseptic treatment, without which the operation should never be performed. Three sizes of artificial vitreous have been, so far, found to be sufficient.

Mr. Henry Power remarked on the physiological importance of the observation that a glass globe could be introduced into the sclerotic and set up no irritation. He had seen the operation of evisceration performed by Mr. Hancock, and was under the impression that it had been performed more frequently and earlier than Dr. Mules supposed.

The President had, in several cases, removed the anterior part of the eye, and cleared out all the contents of the globe. It was an operation he was in the habit of performing occasionally.

Mr. Charles Higgens had seen evisceration performed on several occasions, sometimes deliberately and sometimes accidentally. He was anxious to know on what grounds Mr. Mules claimed that this operation was less likely to be followed by sympathetic trouble than enucleation.

Mr. Adams Frost thought the important point in the operation recommended was the thorough cleaning of the inner surface of the globe. Whether the operation presented any distinct advantages over those now in use as regards the stump left, and, if so, whether it was safe to use the glass sphere, were questions which would require to be carefully considered. He thought that, while we knew so little of the mode of production of sympathetic ophthalmia, it was safer to adhere to the old operation of removing the globe. He enquired whether the operation of evisceration was not much more tedious than enucleation.

Mr. Hartridge suggested that some other material than glass might be used. In the event of the artificial vitreous being broken, the globe would have to be removed at once.

Mr. McHardy could not recall any case in which an artificial eye had been broken when in use; he would certainly try Dr. Mules' operation.

Mr. Benson asked what was the longest time one of the glass globes had been worn.

Mr. Mules thought sympathetic affections were all due to the transmission of some infective cell from the infected eye to the other. In the case of the man shown, when the operation was performed (six weeks before the meeting) the other eye was in a very irritable condition, but, after the operation and the introduction of a glass globe, all the sympathetic trouble disappeared, and had not returned. He had never seen any stump after enucleation which could in the least compare with the stump furnished by the artificial vitreous. If the glass globe were broken, then it would be necessary to remove the globe immediately. This danger, due to the fragility of the glass globe, might be obviated by using a gilded globe of thin aluminium. The operation, from the time when the anæsthetic was commenced to the time when the patient left the table, lasted not more than twenty minutes.

Living and Card Cases.—Mr. M. M. McHardy: A case in which there was a rapidly extending isolated patch of favus on the upper lid of a woman aged 37. It had the appearance of a dry scabbed ulcer, and grew with great rapidity, and had just reached the conjunctival margin; it was excised, and the actual cautery applied. Microscopical sections and a drawing of the original scab were shown. The patient, who had completely recovered, was present.

The President said that isolated patches of favus were, as a rule, best treated by scraping, and were, unless situated on the scalp, generally very amenable to this treatment.

Mr. McHardy also showed a man, aged 39, upon whom Argyll Robertson's new operation for obstinate ectropion of the lower lid, due to long-continued chronic conjunctival inflammation, had been performed.

Dr. C. E. Beevor: Opaque nerve-fibres in a woman aged 35.

Mr. Anderson Critchett and Mr. Juler again showed a patient with an obstinate vesicle of the cornea.

Mr. McHardy suggested that arsenic might be tried; he had found it useful in a somewhat similar case.

Mr. W. Lang: 1. Drawings of detachment of the retina in the yellow spot region; two cases, brother and sister (sister shown). 2. Case of detachment of the retina at the yellow spot region after a blow. 3. Central choroiditis, with disseminated patches in the remainder of the fundus.

Mr. Stanford Morton: Atrophy of choroid in a man aged 55.

Mr. Nettleship: A case of extensive detachment of the retina, including the yellow spot region, probably of several years' standing, in which some vision was present. The patient could count fingers and with glasses could read J 20.

Mr. Arthur Benson: Drawings of cases of primary lupus of the conjunctiva.

RECENT LITERATURE.

A. RETINA. OPTIC NERVE. CENTRES.

CHARPENTIER. Recherches sur la perception différentielle successive.
Arch. d'Ophth., V. 1, p. 1.

DOBROWOLSKY. Ueber den Unterschied in der Farbenempfindung bei Reizung der Netzhaut an einer und an mehreren Stellen zu gleicher Zeit.
Arch. f. Physiol., XXXV., p. 536.

DONDERS. Kleurvergelijkingen.
Onderzoek. Utrecht Physiol. Labor., IX., p. 43.

ENGELMANN. Bewegingen der Kegels van het netvlies onder den invloed van licht en duister.
Onderzoek. Utrecht Phys. Lab.IX., p. 143.

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EPITHELIOMA OF THE EYELID, RESULTING FROM IRRITATION BY CRUDE CARBOLIC ACID.*

By John B. Story, M.B., F.R.C.S.I.,

Surgeon to St. Mark's Ophthalmic Hospital, Dublin.

The occurrence of epitheliomatous ulcers as the result of chronic irritation has long been known to pathologists in the form of chimney sweep's cancer, but it was not, I believe, until Dr. Charles Ball made a communication on the subject to the Pathological Section of the Academy of Medicine in Ireland, that anything was known about a form of cancer which there is reason to believe is induced by the irritation of the skin caused by the local application of crude carbolic acid.

Ball reports the case of a man who had worked with crude carbolic acid for nine years at the gas works, and from whose scrotum he removed an epitheliomatous growth. Two years later he removed a second similar growth also from the scrotum, but not involving the old cicatrix and evidently not connected with the first growth. He also saw an old man employed, in the same works, who had epitheliomatous warts scattered over his body. He was told of two others in whom burns on the face had been followed by ulcers. (Trans. Acad. of Med. in Ireland, 1884, p. 389.)

Within a very few days after Dr. Ball read the communication referred to, a patient presented himself at St. Mark's Ophthalmic Hospital with an affection of the eyelid caused by carbolic acid, and having the characters of a true epitheliomatous growth.

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* Read before the Pathological Section of the Academy of Medicine in Ireland.

CASE: The patient was a man aged 40, employed in a manufactory of crude carbolic acid, at Ringsend Basin. The length of time which he had worked there was not noted. His right eye had been "blind" for sixteen years, from a cataract, probably of traumatic origin; he came to the hospital on the present occasion for advice as to his left eye, the sight of which was becoming affected by a growth on or in the lower eyelid. The history he gave of this growth was as follows:—Four months previously he got a splash of "oil" on this eyelid, which caused an "oil-wart." On questioning him I found that the so-called oil was crude carbolic acid, and the "oil-wart" he told me was a common result of its contact with the skin. He was quite familiar with the warts so produced, and had never heard them called anything else. He had had them frequently on his hands and other places, but had never had any real trouble from one before. I found, indeed, that he had an ulcer on the back of his hand, but its edges were not raised or indurated, and it did not, to my eye, present any malignant characters. This ulcer was better, though not healed, when he left the hospital some weeks later, and since then it has healed without noticeable cicatrix. The "oil-wart" of the eyelid fell off of itself (as he said they often did), but reappeared shortly afterwards in the same place, and this time its growth was accompanied by much swelling of the lid. The trouble it occasioned was so considerable that he consulted an oculist at one of the Dublin hospitals, who cut the wart off, eleven weeks before the date at which I first saw him. The removal of the wart gave but very transient relief, for it began to grow again, or rather the swelling of the lid began to increase a very few days after the operation. The wart proper did not return after this, but the swelling became steadily greater, till it completely prevented him from doing his work by its interference with the sight of the only eye which was of any use to him. For the three weeks before he came to

St. Mark's he noticed a swelling on the inner side of the lid. Up to that time it was only the outside that was swollen.

On examination, I found the left lower lid red and swollen to about the size of a walnut. The tumour resembled considerably a suppurating meibomian cyst, which had opened on the conjunctival surface, and which involved the whole tarsus in its growth. Through the opening on the conjunctival surface a probe could be passed into the cavity of the tumour, and out through a small fistulous opening of the skin just below the ciliary margin. The skin round this opening was indurated and firmly adherent to the mass of the tumour. The rest of the skin of the lid was freely moveable over the underlying mass. Through both openings a thin shreddy discharge could be squeezed out along with cheesy-looking matter. The external opening occupied the situation of the original wart.

The tumour both in its origin and its appearance was not like any growth I had ever seen in this situation, and I should have been at a loss to know what category to assign it to, but for the knowledge acquired from Dr. Ball's observations. Viewing it in the light thrown upon these so-called "oil-warts" by Dr. Ball, I could not but regard it as a tumour of epitheliomatous nature, differing in its origin and in its manner of growth from the epitheliomatous ulcers which commonly attack the eyelids. As, however, some doubt as to its malignant nature still remained, I resolved to give the patient the chance that local treatment afforded, especially as the whole lid would have to be excised if any operation were attempted, and I anticipated difficulty in obtaining sufficient covering for the cornea afterwards. Accordingly the cavity in the interior of the tumour was carefully syringed out daily for several days, and packed with chlorate of potash. I adopted this treatment because Dr. Charles Fitzgerald had stated at the Biological Club that he had obtained satisfactory results from its use in the treatment of true epitheliomatous ulcers of the eyelids. The only result was to increase the internal cavity at the expense of the tumour, but not to diminish in any degree the total size of the swelling; the discharge, too, became more profuse, and the conjunctiva more vascular. I therefore gave up this treatment, and used powdered iodoform instead, but this latter produced no effect whatsoever. After some days the ragged ulcerated edge of the conjunctival opening began by its pressure to set up ulceration and infiltration of the cornea, and I could no longer defer operation without running great risk of complete destruction of the eyeball.

The tumour was removed by a V-shaped incision, preserving as much of the skin as possible. The wound healed satisfactorily in spite of some suppuration along the lines of incision. The corneal ulceration ceased, and so useful an eyelid remained that the patient was able some few weeks later to return to his work, hardly any trace of the operation being visible. At the time of operating it appeared likely that the whole of the diseased tissue was not removed, but as the microscope shows no epitheliomatous masses in the deeper lying portions of the tumour, and as I saw the man more than a year after the operation and found no return of the growth, this was probably not the case.

The eyelid, though small, is large enough to perform its ordinary functions.

The microscopical appearances of the tumour are those of epithelial cancer, as the sections which were kindly made for me by Dr. Denning fully demonstrate.

An interesting point in the etiology of this form of cancer, if we are to accept unreservedly the statements of the patients, is that it does not appear to originate, like chimney sweep's cancer, or the epitheliomata of the lips, from a long-continued chronic irritation of the cuticle, but from one isolated application of the irritant in question.

SCLEROTOMY AND PRELIMINARY IRIDECTOMY.

Dr. Mules, of Manchester, sends us the following note for publication :—

"To obtain the greatest possible effect by sclerotomy it is well to perform a small iridectomy with a broad needle and Tyrrel's hook at the upper cornea-scleral junction as a preliminary, following this up as soon as advisable by a very large scleral section. The tension of the eye is permanently reduced, even to subnormal. The scleral bridge retained by de Wecker can be dispensed with. No prolapse of the iris occurs."

Ernst Fuchs (Liege). The Causes and Prevention of Blindness. *Wiesbaden. J. F. Bergmann*, 1885.

(Continued from page 105.)

Section V. *Contagious Diseases.*—This class consists of purulent and diphtheritic conjunctivitis. It is not certain that simple catarrhal conjunctival conjunctivitis is contagious; in any case the disorder finds no place here, as it is never a cause of blindness.

Purulent Conjunctivitis occurs in various forms: the following classification assumes an identity or a relationship between several disorders which is not generally accepted: it has, however, the authority of von Arlt, and is based on clinical facts of much cogency :—

Blenorrhœa	Acute	Gonorrhœal Ophthalmia. Purulent Ophthalmia of Infants.
	Chronic	Granular Ophthalmia. Papillary Ophthalmia.

With regard to the acute varieties it is allowed by all authorities that the purulent ophthalmia of new-born infants is essentially the same disease as the gonorrhœal ophthalmia of adults.

The chronic forms of purulent inflammation of the conjunctiva may be classed as of two kinds, according to the structural changes which they produce, viz., (A) a disease characterised by the formation of "sago-grain" granulations (trachoma, Egyptian, military, or follicular ophthalmia); this occurs sometimes in an acute form, but much more frequently as a chronic disorder having for long periods but slight inflammatory symptoms or none at all. (B) A disease in which the papillæ of the conjunctiva become hypertrophied (chronic purulent ophthalmia, or papillary trachoma); this is usually associated with well-marked inflammation.

The following considerations appear to justify the belief that these two forms are but varieties of one and the same disease. The majority of cases which come under notice are of mixed character, and this finds confirmation in the recent microscopical researches of Mandelstamm and Raehlmann. The clinical characters of the two are similar: both are contagious, run a tedious course, and end in cicatricial contraction. An individual suffering from the one form may, by contagion, infect another individual with the other form. In the blind institution at Budapest, Goldzieher observed an epidemic in which acute purulent ophthalmia was imported by a new comer, and spread among the inmates, producing all varieties of disease, from typical blenorrhœa to typical sago-grain trachoma. Piringer, in a series of experiments published in 1841 (experiments which it would be difficult, we think, to justify), practised a series of inoculations with matter of various kinds on eyes blind but healthy as to the conjunctiva. He found that the same matter would produce the two different forms of the disease in different persons, and in one instance in the two eyes of the same individual. Sattler records the following case:—A woman suffering from slight vaginal discharge, bore a child which acquired a mild purulent ophthalmia; from this again the mother's eyes were inoculated, and developed a typical trachoma, although trachoma was unknown in the neighbourhood, and infection from other sources was excluded.

It is then indubitable that an acute purulent ophthalmia may, by inoculation, cause in one case a chronic purulent ophthalmia, in another a granular ophthalmia. It is possible that all purulent disorders of the conjunctiva are derived from discharges from the genitals, direct inoculation setting up the acute form of inflammation in the eyes, and this, after becoming chronic, transmitting the chronic forms to other persons. Neisser discovered a characteristic micrococcus (gonococcus) in the discharges of gonorrhœa and acute blenorrhœa. Sattler and Leber found the same in the discharges of trachoma, the former in the substance of the granulations also. Inoculation with these organisms, after their further production by cultivation, set up typical trachomatous inflammation. Should these observations be confirmed a strong case would be made out for the identity of the acute and the chronic forms of blenorrhœa. In any case the identity of the two chronic forms may be maintained, and this with all the more safety inasmuch as no difference can be drawn between the two as regards prophylaxis.

All forms of purulent ophthalmia are alike in that they do not arise spontaneously, but are due in all cases to infection, the infecting matter being derived from the discharge either from an unhealthy vagina, from a male urethra affected with gonorrhœa. or from an eye itself the seat of purulent conjunctivitis. The inoculation is sometimes direct, as when matter is projected from the eye of a patient into that of the surgeon; more frequently it is indirect, the matter being carried by the fingers, towels, sponges, and so forth. The danger of infection is greater in proportion as the infecting discharge is profuse and purulent. The acute forms of purulent ophthalmia are more readily transmitted than the chronic; the period of incubation after infection is shorter, the outbreak is more violent. Acute purulent ophthalmia derived by inoculation from a case of the same kind may break out after an incubation of only six or eight hours; the incubation of trachoma after inoculation may extend from seventy-two hours to seven days or even longer. Perfectly fresh secretion is more virulent than that which has been dried on a cloth, though the latter may retain its infective property for thirty-six hours or more: the disease then produced is of milder type and its incubation longer. Dilution with water diminishes the virulence of the poison in like manner. The liability of an eye to infection varies much according to its own state; catarrh of the conjunctiva increases it. It is uncertain whether the infective matter is capable of transmission through the air alone.

Ophthalmia Neonatorum.—In the large majority of cases the eyes are infected from the maternal discharges; occasionally one infant infects another. As the child's head traverses the maternal passages its eyes are closed and, unless birth be delayed, are probably not often infected actually during the transit. The secretion which adheres to the eyelashes and edges of the lids readily finds its way to the conjunctiva when the eyes are first opened and closed after birth. It is said that male infants suffer in somewhat larger numbers than females. The reason of this may possibly be that the larger heads of the latter pass more slowly through the maternal passages. The infection of the eyes of the infant does not necessarily imply a virulent purulent discharge on the part of the mother; it may arise from a simple catarrhal state of the vaginal mucous membrane, or from such leucorrhœal discharges as are extremely common in the later stages of pregnancy, especially among the poorer classes.

If the infection occurs during or immediately after birth the inflammation usually appears on the second, third, or fourth day, the incubation being shorter or longer according to the virulence of the poison. If the eyes be already affected at birth, which is sometimes the case even to the extent of both cornea being already destroyed, it must be assumed that they have been infected *in utero*, and it is possible that this is sometimes brought about by the finger of the medical man during examination after rupture of the membranes, especially in face presentations. If the disease shows itself later than the fifth day the infection must have taken place after birth, probably through unhealthy lochial discharge conveyed by the mother or the nurse to the eyes of the child or through inoculation from the eyes of another child suffering from the same disease. In certain lying-in and foundling hospitals it has been known to arise in this latter way in no less than thirty-nine and twenty-five per cent. of the cases.

It has been supposed that exposure to strong light and some other non-infective agents may cause the disease in question, but this can no longer be admitted. It is improbable even that the infection can arise, as some suppose, from the discharge of pus from the nipples of the mother or from the navel of the infant, for we know that the pus which is discharged on to the conjunctiva from an inflamed tear sac or from a fistula in connection with carious bone, though it may set up a catarrhal condition of the junctiva and severely invade the cornea, never leads to a true purulent conjunctivitis, and experiments have shown that various other forms of pus and decomposing tissue are similarly inoperative. It would seem, therefore, that purulent ophthalmia is due to the action of an organism which finds a suitable nidus only on the mucous membrane of the genitals and on the conjunctiva.

The frequency with which Ophthalmia Neonatorum occurs among the population at large is not accurately known. Statistics of its occurrence in certain lying-in hospitals and foundling institutions have been recorded, but even these are not accurately comparable amongst themselves, for some observers include the mild catarrhal forms of the disease while others exclude them—that they may rightly be classed as due to infection, follows from the fact that their frequency has been equally diminished with that of the purulent forms by the disinfecting measures described below. In a series of statistics extending over many years, obtained from twelve lying-in hospitals in Austria, Germany, Russia, and Sweden, the maximum percentage of children affected in any one year was 25·3, the minimum 0·8; among the foundling hospitals of Prague, Vienna, and St. Petersburg, the maximum and minimum percentages were 10 and 4·31; in the latter institutions from one-fourth to one-third of the cases occurred through infection of one infant by another.

Among the better classes of society the disease is certainly less frequent than this, but among the poor it is probably more frequent, for the facilities for personal cleanliness, and for obtaining clean bedding, linen, towels, and so forth, are much greater in a well-managed hospital than in the homes of the very poor. The reports of eye hospitals give no information as to the general prevalence of the disease, or even as to its frequency in relation to other eye disorders, for it is very frequently neglected, and only the worst cases come under the care of the oculist. Among more than twenty thousand cases Hirschberg met with it in only 1·46 per cent.

The degree of danger attending it can only be very roughly estimated. According to the records of four German lying-in hospitals, permanent damage to the eyes was witnessed in from 1·9 to 4·6 per cent of the infants affected; in the foundling hospitals of Prague and Vienna, such damage resulted in 21 and 45 per cent. But it is to be noted that from the lying-in hospitals the women are frequently discharged eight or ten days after delivery, although the eyes of the child may be affected, and that little is known as to the ultimate fate of the latter; while the high percentage of disasters in the foundling hospitals is partly due to the fact that many of the cases are serious or hopeless through neglect when the infants are received. Among cases which are brought to eye hospitals for treatment, permanent damage appears to occur in from 17 to 40 per cent.; total blindness of both eyes in from 3 to 4 per cent.

The proportion which this disease bears to other diseases in the causation of blindness is also not yet determined with anything like precision. Our knowledge concerning it is derived from three sources: from the inmates of blind asylums, from the blind persons applying for relief at eye hospitals, and from examinations of the entire populations of given districts. In certain blind asylums of Austria, Germany, France, Holland, and Denmark, the proportion of the inmates blinded from this cause was found to vary between 34 and 46 per cent. This is certainly a higher proportion than would be found among the entire blind community, for the inmates of the asylums are chiefly the young, among whom this form of blindness is proportionately more frequent than at a later age. From the records of ten German cliniques Magnus found that about 10 per cent. of the blind had lost their sight in this way; Cohn found a nearly similar proportion at Breslau; in Parisian hospitals Daumas and St. Hilaire found no less than 69 and 27 per cent. But in most eye hospitals these cases probably bear to other cases of blindness a somewhat lower proportion than amongst the general community, for the blindness is usually recognised as final and complete in early life, and application for treatment is not made. Examinations of entire communities as to this point have as yet been little made; in Brunswick 28 per cent. of the blind were found to have suffered in this way, in Nassau 13 per cent.

The prevention of Ophthalmia Neonatorum is one of the most important, and, at the same time, one of the most successful tasks of hygienic science; it is possible in the great majority of cases to prevent the occurrence of the infection, and when, in spite of all precautions, the infection does occur it is almost always possible to prevent its causing loss of sight. So long ago as 1807 Gibson laid down very accurately the principles of treatment: 1.—The leucorrhœa of the mother is to be cured as far as possible during pregnancy. 2.—If it persists the noxious secretion is to be removed from the vagina during labour. 3.—The eyes of the child are to be cleansed immediately after birth with a fluid which either removes the poisonous material or obviates its injurious action. Strange to say this advice, excellent as it is, has until very recently remained unheeded, although the infective nature of the disease has become more and more certain. The first serious attempt at systematic measures of the kind was made at Basel in 1875 by Bischoff, and his example has been followed by Schiess, Crédé, Abegg, Schirmer, Fieuzal, Krukenberg, Königstein, Schmidt-Rimpler, and others.

The procedures adopted are of two kinds, viz.:—disinfection of the maternal passages, and disinfection of the eyes of the child. In the earlier articles published on the subject stress was laid on the former of these, but to what extent it is efficacious cannot be determined because the other procedure was always adopted with it. At present chief importance is attached by most authorities to the disinfection of the eyes of the infant. The methods in use are of three kinds: 1.—Simple cleansing of the eyes with pure water and the careful avoidance of contamination with the water of the bath in which the body is washed. 2.—Cleansing with a disinfecting fluid, *e.g.*, chlorine water, or solution of borax, salicylic acid, or carbolic acid. 3.—Instillation of solution of nitrate of silver. A comparison of recorded results shows that a simple careful cleansing of the eyes suffices to reduce to some extent the frequency of the disease, that carbolic acid produces more effect, and that nitrate of silver is better still. A two per cent. solution of carbolic acid may be used without danger to the eye, although now and then some swelling and eczema of the lid follow; a solution of nitrate of silver of the same strength causes in most cases no reaction; in a few there is some hyperæmia and secretion from the conjunctiva, which passes away of itself in two or three days at most. A weaker solution than this was found ineffectual. The comparative efficacy of the two substances may be judged from the following table showing the results obtained by Königstein among large numbers of infants :—

	Number of Infants.	Percentage of Blennorrhœa.	Percentage of Catarrh.	Percentage of Both together.
Without treatment	1092	4·76	14·5	19·26
With one per cent. carbolic acid....	1541	1·42	6·	7·42
With two per cent. nitrate of silver..	1250	0·72	4·72	5·44

The method recommended by Crédé, by which he has himself so far reduced the frequency of the disease that he met with it only once or perhaps twice in the last 1,600 cases, has the merit of being simple and very easily carried out. Immediately after the child is washed a single drop of the two per cent. silver solution is dropped into each eye with a glass rod, the lids being held slightly apart so that the drop falls on the centre of the cornea. Further trials with solution of corrosive sublimate are to be desired, for according to recent observations this substance is the most certain of all antiseptics.

The above-named precautionary measures have hitherto been used chiefly in lying-in hospitals, but there are strong reasons for their introduction elsewhere. The number of births in these institutions forms a very small fraction of the total number amongst the community, and the danger of ophthalmia is far greater when it occurs outside, for it is then less likely to receive prompt and efficient treatment. If, however, such preventive measures are to be carried out in all cases they must be entrusted to midwives, under whose hands a very large number of labours fall, especially amongst the poor, and if this is to be done they must be of the simplest kind. Some authorities have insisted that to be efficiently dealt with the eyelids must be everted, and this certainly could not be entrusted as a routine practice to midwives, as it might easily involve more harm than good to the eyes of the infants. But experience proves that eversion of the lids is not necessary to the attainment of the results aimed at ; the simple proceeding of Crédé answers the purpose, and may be easily carried out by every nurse after instruction as to what is required. Attention has already been called to the matter in an official manner by the Governments of Prussia, France, Austria, and Hungary.

Infection after birth is supposed by some writers to happen frequently through the medium of the water in which the infant is washed, but from the fact that dilution with water greatly reduces the infective power of the poison this does not seem very probable; it is desirable, nevertheless, that for the first day or two the face should be washed with pure water distinct from that in the bath. Care should also be taken at this same period lest through any carelessness infection occur from the lochial discharges. Among infants received at foundling hospitals a considerable number probably bring the seeds of the disease with them, although symptoms may not appear until a day or two later; it ought to be the rule, therefore, to treat the eyes of each infant on its reception with a single application of the two per cent. silver solution. The spread of the disease in these institutions is due to want of cleanliness and care among the attendants, and to overcrowding. Separate utensils for each child, and more especially the careful isolation of the infected children, are important for its prevention.

Where preventive measures are efficiently carried out Ophthalmia Neonatorum becomes extremely infrequent, and when proper treatment is promptly adopted, cases in which it does occur are almost all cured. A complete cure is possible in almost every case which comes under care before the cornea is infected. Worse than no treatment at all are some of the so-called remedies resorted to by the ignorant poor, such as the application of raw meat to the eyes, or bathing them with urine. Unfortunately, the midwives, who ought to understand the danger and see that every case of the kind is at once taken to a medical man, too often stand in the way of proper advice being obtained. It should be the duty of the midwife, under a penalty, to urge the parents to obtain proper medical advice, and in the event of their neglecting to do so to report the case to her official superior, in order to free herself from further responsibility. In Austria and in Switzerland this is already the law, and the results are excellent; Horner reports that since the year 1865 not a single case of blindness caused by Ophthalmia Neonatorum has been admitted to the Zurich Blind Asylum.

For the efficient prevention of the disease the Government should require that every midwife should be instructed as to the nature and dangers of the disease and trained in carrying out the necessary measures of disinfection before and after birth, and that every case of the kind should be brought by the midwife under proper medical treatment or officially reported; should institute a proper control for the carrying out of these regulations; and should instruct the public by suitable official notices of the danger attending the disease.

Acute purulent ophthlamia in the adult is produced, like the foregoing, by infection either from the genital organs or from an eye similarly affected. The poison is carried in most cases by the fingers. Cases have been met with in which inoculation has occurred through the disgusting habit of bathing the eyes with the urine. It appears that a simple catarrh of the vaginal mucous membrane may suffice to cause the disease in a severe form, for small children thus affected sometimes get an acute ophthalmia. The mothers and nurses of infants suffering from purulent ophthalmia are much exposed to danger of infection, and in lying-in and foundling hospitals the disease is common among them. The disease is much less common, however, in adults than in children; it is much more dangerous in the former; the best treatment sometimes fails to save the eye.

The prevention of the disease depends upon knowledge of its nature and attention to cleanliness. With the disappearance of ignorance and dirt from among the lower classes, the frequency of purulent ophthalmia will certainly diminish. It should be the duty of medical men when treating a case of gonorrhœa to warn the patient of the danger to the eyes. The use of the syringe for the removal of discharge from the vagina or conjunctival sac involves danger to the eyes of the operator, and many eyes have been lost in this manner. The routine use of protecting spectacles at such times is advisable. For the cleansing of the conjunctiva the syringe involves danger to the patient's as well as to the doctor's eyes, and is very properly falling into disuse. When the disease has already broken out, prompt treatment is urgently required. If one eye only is affected, the other must be protected by occlusion. If the second eye already shows the first signs of infection—apart from simple catarrh, which is easily induced by the occluding bandage—the mischief may sometimes be cut short by the use once or twice daily of the two per cent. silver solution. If, however, the inflammation is already pronounced, cauterisation is contra-indicated until the acute infiltration has passed its height and a free purulent discharge is established.

(To be continued.)

NICOLO MANFREDI. On the Spontaneous Dislocation of the Crystalline Lens in Congenital Ectopia Lentis, and the Secondary Glaucoma to which it gives rise.—*Archivio per le Scienze Mediche, Vol. VIII., No. 9.*

The views of Manfredi on the subject of idiopathic dislocation of the lens are for the most part founded on the study of a case which is very fully described in the paper appearing under the above title. The main features of the case were the following :—

Right eye—cornea normal, with the exception of slight cloudiness of lower third; pupil widely dilated and perfectly black; iris completely atrophied; behind the pupil, and deeply placed, an opaline body, oscillating with the movements of the eye; tension normal; vitreous perfectly transparent, without any trace of opacities; papilla normal; refraction H $\frac{1}{3}$ when placed in the supine position, face downwards N $\frac{1}{3}$. *Left eye*—episcleral and pericorneal injection; cornea very hazy and anæsthetic; anterior chamber abolished; pupil irregularly dilated; tension considerably increased; fundus not visible V = fingers at half-metre. There was a previous history of an acute attack in the right eye as well.

Diagnosis. Right eye—secondary glaucoma owing to dislocation of lens into anterior chamber, which had been spontaneously arrested by the disengagement of the lens from this position in consequence of the glaucomatous atrophy of the iris. *Left eye*—existing secondary glaucoma from the same cause. When on the point of proceeding to extract the lens of the left eye, and after having, for this purpose, introduced the speculum, the patient made violent movements, and spontaneous reduction of the dislocation took place, leaving the cornea transparent, and causing an immediate disappearance of all the other symptoms. The refraction was subsequently found to be H $\frac{1}{3\frac{1}{2}}$, and V, some months afterwards, $\frac{15}{20}$.

After six months a similar attack occurred, and the lens were extracted, with result $V=\frac{3}{4}$.

Manfredi holds, then, that the condition of ectopia lentis may be one of the causes of spontaneous dislocation of the lens into the anterior chamber. This view is in opposition to that of many who consider that the position of the lens in that defect remains absolutely unchangeable, and who ascribe dislocation into the anterior chamber to one of two causes alone, viz., trauma, or intra-ocular disease. In support of his opinion Manfredi calls attention to the following points in the case described: (1) The complete absence of any suspicion of a trauma, as well as of any intra-ocular disease, as shown by the transparency of the vitreous, absence of staphyloma postreum or axial myopia; (2) the co-existence of the anomaly in both eyes; (3) the statement of the patient that with the correction for aphakia his vision was better than ever before; (4) the transparency of the dislocated lenses. Fluidity of the vitreous, regarded by von Græfe as being constantly present in cases of dislocation, Manfredi believes not to have existed in his case, for the following reasons: (1) the normal position assumed by the lens on the anterior surface of the vitreous when the patient lay on his back; (2) the absence of floating opacities in the vitreous; (3) the normal consistence of the small amount of vitreous which escaped during the operation.

The secondary glaucoma, indicating an interruption of the intra-ocular lymph currents, he ascribes not to the impaction of the lens margin in the angle of the anterior chamber, but to the blocking of the pupil, and this owing to the clinical fact that in these cases the pupil is always more or less obscured by the lens; owing also to the immediate cessation of the symptoms on the lens becoming dislodged from its abnormal position, combined with the complete absence of any trace of inflammation afterwards.* The proper operative treatment of such cases is extraction, and not iridectomy as advised by Mauthner and others.

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* For cases of glaucoma following dislocation of the lens. *Vide* O. R., Vol. I., p. 209; Vol. II., p. 257.

R. Rubattel (Lausanne). The Development of the Crystalline Lens. *Inaugural Dissertation at the University of Berne. Schuchardt, Geneva,* 1885.

A preface is affixed to this thesis by Prof. Ed. Bugnion, of Lausanne, under whose direction the investigations were carried out. The principal result of the work is to advance an additional argument in support of the view that the lens capsule is mesodermic in its origin. Bugnion regards it as the morphological analogue of those basal membranes which separate the epithelium from the subjacent connective tissue—such as Bowman's layer in the skin—and which are situated upon the under surface of the epithelium, and do not, like cuticular membranes proper, lie upon its free surface. The demonstration of this theory is rendered difficult by the fact that the connective tissue, which in the embryo at one period completely surrounds the lens, becomes absorbed later on over its whole anterior surface, leaving the capsule isolated from the mesoderm.

The main point brought forward in the paper is the presence in the embryonic lens of a layer of semi-liquid matter, either homogeneous, or finely granular from the effects of reagents, separating the capsule from the tissue of the lens proper, and also extending into the sutural fissures, which form the so-called star of the lens, and which are much larger in the embryo than in the adult. The last trace of this substance in the adult lens is constituted by a delicate layer between the capsule and the fibres, in which a reticulated appearance is visible, as described by Becker and Schwalbe.

It is admitted by most embryologists that a delicate mesodermic layer separates the lens from the ectoderm after the descent of the former beneath the surface of the latter; but while some derive the lens capsule from the connective tissues, others assign to it a cuticular origin, and Kölliker derives the anterior half from the cuticle, and the posterior half from the mesoderm. The existence, then, of this homogeneous layer above mentioned between the capsule proper on the one hand, and the lens fibres and the so-called capsular epithelium on the other, may be regarded as quite sufficient to refute the ectodermic origin of the capsule. Bugnion and Rubattel have never failed to find it in the embryonic lens, and even in the adult lens (in the pig) they have observed a fine homogeneous line separating the anterior epithelium from the capsule proper. They seem to identify this line with the sub-capsular albuminous zone described by Deutschmann, while they regard the sub-epithelial network of Deutschmann as the remnant of the homogeneous substance which is present in the interior of the embryonic lens. The capsule itself they have always found in intimate union with the tunica vasculosa lentis, and always associated with the presence of vessels. Kölliker, on the other hand, has described a human embryo in which the capsule was visible before the appearance of any vessels in its neighbourhood.

The existence of a layer separating the embryonic lens-capsule from the fibres of the lens is not altogether a new discovery. So far as the posterior capsule at least is concerned, J. Arnold has described a space behind the equator and at the posterior pole, separating the fibres from the capsule. The facts brought forward by Rubattel are highly important, inasmuch as they establish the existence of this layer on all the surfaces of the lens, and, therefore, permit us to conclude that there is no more reason for assigning an epithelial origin to the anterior capsule than there is for so doing to the posterior.

Among other points in favour of the connective tissue origin of the capsule we may call attention to the following: (*a*) The system of fine lines observed in it on cross section by Arnold, Frey, Kölliker, and many other microscopists. (*b*) The admission by most authorities that there is a mesodermic layer present completely surrounding the embryonic lens. (*c*) The fact that an observer like J. Arnold has always in *young* embryos found it impossible to isolate the capsule from the surrounding vascular tissue, although in older embryos this isolation is easy. (*d*) The fact that the capsule is placed on what corresponds to the deep surface of the epithelium, a position occupied by basement membranes, but not by cuticular membranes. One great advantage of the view here adopted of the origin of the capsule is that the connection between it and the zonula and hyaloid membrane becomes more intelligible than is possible when such widely differing origins are assigned to these structures as is done by any other theory which has been proposed.

E. Fuchs (Liege). The Anatomical Relations of the Venæ Vorticosæ to the Eyeball Muscles. *Von Graefe's Archiv., XXX., 4, p. 1.*

In order to ascertain what grounds exist for Arlt's theory concerning the etiology of acquired myopia, namely, that a passive hyperæmia of the uveal tract is set up by the pressure of rectus externus and obliquus inferior upon the venæ vorticosæ during continued convergence, Fuchs has studied the topographical anatomy of the eyeball with special reference to the question whether the external muscles can compress in any wise the venæ vorticosæ, and, if so, when that compression takes place.

The first point investigated was the distance between the insertions of the muscles into the sclera and the margin of the cornea.

The following figures show the mean distances in millimetres in thirty-one emmetropic, twenty myopic, and four hypermetropic eyes :—

Rectus Internus	E 5·5	M 5·5	H 5·2
,, Inferior	E 6·5	M 6·9	H 6·0
,, Externus	E 6·9	M 6·9	H 6·4
,, Superior	E 7·7	M 7·7	H 7·1

Considerable variations existed in the relative distances of the internal and external recti from the cornea; in many eyes the difference amounted to 2·5 mm., an amount that should have some influence upon the relative powers of the muscles. A curious point is that in both E. and M. this difference was on the average 0·5 mm. greater on the right side than on the left, the rect. ext. being inserted closer to the cornea in the left eye than in the right. Fuchs considers this difference accidental.

In about half the eyes the insertions of the internal and external recti lay symmetrically with regard to the horizontal meridian—that is, the latter bisected the lines of the insertions. The commonest asymmetry was a depression of the insertion of the R. int. and an elevation of that of the R. ext. The line of insertion was perpendicular to the horizontal meridian in less than half the cases. Frequently the upper end of the insertion of the R. int. and the lower end of that of the R. ext. lay nearer to the cornea than the other ends of their respective insertions.

The insertions of the rectus sup. and inf. exhibited more asymmetry. In most cases the larger portion of the insertion of the R. sup. (up to two-thirds) lay to the outer side of the vertical meridian. That of the R. inf. was bisected by this meridian in about one-third of the cases; in the remainder it was mostly displaced outwards. The inner end of the insertion lies in both cases nearer to the cornea than the outer end. This asymmetry of the insertions counteracts to a certain extent the adduction which the direction of these muscles entails.

The mean extent of the line of insertion was found to differ as follows:—

Rectus Internus	E 10·3	M 11·4	H 10·2
,, Externus ..	E 9·2	M 10·1	H 9·1
,, Superior	E 10·6	M 10·9	H 9·9
,, Inferior	E 9·8	M 10·4	H 9·6

These figures have no relation to the relative power of the different muscles. In E. the weakest muscle had the largest insertion.

It appears from the above that in M. the insertions are broader than in E., and as they are not further removed from the corneal margin we must assume that the myopic eye, while considerably enlarged in its equatorial diameter, is not correspondingly enlarged in the antero-posterior direction. This assumption naturally holds good only for the anterior portion of the globe.

The form of the line of insertion varies. That of the R. int. and R. ext. is either a straight line, or a slight curve with its convexity forwards. That of the R. sup. and inf. is curved, and the curve is sharper. Occasionally the R. sup. is inserted in a wavy line.

The anterior end of the line of insertion of the Obliquus superior lies very nearly in the same meridian as the outer end of the insertion of the R. sup. The distance between these two points varies between 0·5 and 8 mm. It was found on an average to be 4·6 mm., and in many eyes the one point was as far in front of the equator as the other point was behind it. In one myopic eye an actual connection between the tendons was found.

The insertion line of the Obliq. sup. is a curve, with its convexity backwards and outwards. Two types may be distinguished ; one with a strong inward direction, so that the line crosses the vertical meridian, and occasionally has its inner end as far inwards as the inner end of the insertion of the R. sup. ; the other shorter and less curved, beginning more anteriorly, nearer the equator, and running more backwards and less inwards, so that the posterior end terminates to the outer side of the vertical meridian. The first of these is common in E. and best marked in H. The second is more common in M. Fuchs considers the emmetropic type as the normal one, and that it is changed into the myopic type by the gradual atrophy of the most internal fibres produced by the excessive drag which must fall upon them when the eyes are turned inwards, and especially downwards and inwards. If the line of insertion is very oblique the anterior fibres will be actually relaxed in this movement. The extent of the insertion is less in M. than in E. ; average, E. 10·7, M. 9·6.

The Obliquus inferior possesses the shortest tendon, and is the most variable of all the eyeball muscles as regards its insertion. The anterior end of the line of insertion lies pretty nearly in the same meridian as the lower end of that of the Rectus externus. The distance between these points is on an average greater in M. than in E. (M. 9·7 mm., E. 9·3 mm.) In E. the one point lies about as much in front of the equator as the other lies behind it. In M. this relation is changed by the displacement of the equator backwards. The insertion line is a low curve convex upwards and forwards. The larger part of this line lies below the horizontal meridian. The chord of this arc makes an angle of 19° with the horizontal meridian, while that of the Obliquus superior makes one of 45° with the same meridian, so that it is incorrect to describe these insertion lines as parallel as is done in many text books. The variations are considerable. The whole insertion may lie above the horizontal meridian, and its direction may in one eye be nearly perpendicular to its direction in another. Its length is greater in M. (average 10·5 mm.) than in E. (average 9·4 mm.) This naturally results from the meridional distension of the sclera which occurs in M. The Obliq. inf. is inserted so far back as to fall within the region where this distension takes place.

Position and number of the venæ vorticosæ.—The typical arrangement is four veins forming an upper and a lower pair. The upper pair lie one on each side of the vertical meridian, the external one nearer to it than the internal. They pierce the sclerotic about 7 or 8 mm. behind the equator, the external the more posteriorly of the two. The lower pair bear the same relation to the vertical meridian as the upper, but pierce the sclerotic more anteriorly (average 5·5 to 6 mm. behind the equator). They all pierce the sclerotic very obliquely, diverging also from the vertical meridian as they approach the choroid. Their inner openings lie from 2·5 to 3·5 mm. behind the equator. In only about one-half the cases was this typical arrangement present. In the others there were from five to seven veins. The upper inner vein was mostly the doubled one, the lower inner being less frequently doubled; while the external veins were but rarely abnormal, the upper outer vein being never found otherwise than single.

The average distance of the points of exit of these veins, measured from the corneal margin, was as follows:—

Superior Temporal Vein	E 20·2 ..	M 20·5 ..	H 17·6
Superior Nasal Vein	E 19·3 ..	M 19·4 ..	H 17·4
Inferior Temporal Vein	E 17·4 ..	M 17·1 ..	H 14·9
Inferior Nasal Vein	E 18·0 ...	M 17·6 ..	H 16.4

It is seen that in H. the veins lie closer to the cornea, owing to the short antero-posterior axis, but no difference occurs between their position in E. and in M., because the meridional distension of the myopic eye takes place behind the place of exit of these veins. On the contrary, the distance of the points of exit of the veins of each pair from each other is greater in M. than E. (upper pair E. and H. 8·1 mm., M. 8·8 mm.; lower pair E. and H. 9·0 mm., M. 9·5 mm.), owing to the greater equatorial diameter in M. The veins appear to be arranged symmetrically if the papilla be taken as a point on the great circle joining the upper and lower points of the globe. The upper outer vein has the longest canal in the sclerotica, 4·6 mm.; the upper inner vein next, 3·3 mm.; and the veins of the lower pair the shortest, 3 mm.

The arrangement in some of the domestic animals is essentially the same as in man, namely—the horse, sheep, pig, cat, and dog. In some animals a simpler type is found, viz., one vein for the upper and one for the lower half of the globe (Gadus Morrhua: R. Virchow). Fuchs found only one vein in the upper half of the human eye in two eyes affected with coloboma of the choroid

Each vein commences as a sinus in the choroid before it pierces the sclerotic. Both the choroid and the suprachoroidea are thinner than elsewhere in the neighbourhood of this sinus. The vein then contracts before it begins to pass out through the sclerotic. The wall of the vein is exceedingly thin until it reaches the outer surface of the eyeball, when it suddenly becomes thicker, reaching ten times its previous thickness. The vein is surrounded by a lymph space as it traverses the sclerotic. This lymph space is lessened, and frequently obliterated, on the outer side of the vein, especially near the external end of the vessel.

Relations between the venæ vorticosæ and the eyeball muscles.— The external and internal recti do not come into any relationship with the veins; and though the points of exit of the veins are related to the edges, and sometimes to the surfaces of the sup. and inf. recti, the situation is so far behind the equator that these muscles can exercise no pressure upon the blood, orbital fat intervening and relieving the pressure.

The case is otherwise with the oblique muscles. The superior oblique is frequently so situated as to press upon the superior temporal vein as the latter leaves the sclerotic. It was found in this position in twenty-three per cent. of the emmetropic and hypermetropic eyeballs, while in seventy-seven per cent. of these eyes the vein opened so far behind the muscle that no pressure could be exerted. In myopia this relation was reversed. In seventy-three per cent. of the eyes the vein was exposed to pressure and in twenty-seven per cent. no pressure could be exercised. It is only very rarely that the inner upper vein can be pressed upon. Fuchs only found such a relation in five eyes, none of them myopic.

The Obliquus inferior was found in every eye to occupy such a position that it could press upon the external lower vein, but never upon the internal lower vein. Fuchs was able to observe the actual effects of the pressure of the superior oblique in a suitably prepared preparation. Every time he stretched the muscle the vein emptied.

The result of this is that alternating contraction and relaxation of the obliques materially assists the outflow of blood from the eyeball, but continuous contraction of these muscles on the other hand leads to serious obstruction. The worst of all positions must be that in which both eyes are turned inwards and downwards, for then both obliques are more closely applied to the sclerotic; by the rolling outwards of the posterior segment of the globe, the obliq. sup. is contracted to turn the globe downwards, and the obliq. inf. also in order to keep the vertical meridians parallel.

This position then may tend to the production of myopia by obstruction to the venous outflow from the two outer venæ vorticosæ, which are the veins which take the choroidal blood from the posterior pole of the globe. In support of this view Fuchs brings forward an observation made by himself to the effect that atrophic changes are more common in the outer half of the choroid than in the inner, both in emmetropic and myopic eyes.

Against this theory must be ranged the fact that Fuchs found no dilatation of the venæ vorticosæ in myopic eyes.

PEDRO LAGLEYZE (Buenos Ayres). Cysticercus in the Vitreous. *Revista Argentina de Ciencias Medicas. Sept.*, 1884.

The following is the first case of cysticercus in the eye occurring in the Argentine Republic which has been published.

The patient, a man 34 years of age, of robust constitution, had passed a single tapeworm in Mendoza, the city where he lived, six months before the commencement of the eye-affection. This latter began with slight pains over the right superior orbital arch, accompanied by flashes in the right eye, which he compared to lightning. Vision failed gradually. A month after the commencement of the affection in the right eye he found that vision was failing in the left eye also: he therefore consulted a medical man, who treated him for more than a year before he came to Buenos Ayres. He was admitted to hospital in Buenos Ayres, under the care of Dr. Don Cleto Aguirre, in 1880.

When examined there was no injection of the conjunctiva or sclera in either eye; the corneæ were normal, the pupils somewhat dilated and sluggish.

Right eye $V =$ barely counting fingers; tension much reduced; the field of vision presented an extensive hiatus at the upper part; the optic disc atrophied; springing from the lower half of the retina and somewhat to the outer side a cysticercus having the appearances described below.

Left eye $V = \frac{1}{7}$; tension normal; field of vision contracted in an almost concentric manner; optic disc atrophied as in the fellow eye.

In the right eye the ophthalmoscope revealed the characteristic appearance of a cysticercus in the vitreous. It had no movements proper to itself. When the eye moved in any direction, the animal inclined to one side or the other, acting simply under the influence of the vitreous humour. The centre of the entozoon was of a reddish tint, due to its transparency, which permitted rays reflected from the fundus of the eye to pass through it; at the borders it was darker because of the oblique incidence of the rays on the surface. On the neck were yellow lines, and the head was of a similar tint, with some blueish coloration. Two suckers could be seen. The extremity of the head showed no corona of hooks. The cysticercus was dead at the time of examination, but probably it had not long been so, for at the end of a month its appearance had entirely changed, the head being globular, the neck shrunken and hardly distinguishable from the body. On the body were longitudinal markings like creases. The colour had changed to a greyish white, the texture was opaque, and the red tint of the fundus could no longer be seen through it. The retina was loosened where the cysticercus was attached, the detachment extending towards the centre of the fundus.

The atrophy of the discs was regarded not as being due to the cysticercus, but merely as a coincidence. The treatment which was employed was directed to arresting the atrophy, but without success.

TH. MAXWELL.

O. F. Wadsworth (Boston, U. S. A.). A case of Myxœdema with Atrophy of the Optic Nerves. *Boston Med. and Surg. Journal, Jan. 1st, 1885, p. 5.*

Beyond the fact that there is a formation of mucine in the subcutaneous tissues, the pathology of myxœdema is at present unknown. The symptoms observed in the cases reported have presented considerable variations. Signs of disturbance in the cerebral nervous system have been present in some cases, but an affection of the optic nerves has not, so far as the author knows, been described hitherto; possibly it may have been coincident merely, and not essentially connected with the myxœdema in the present case.

Mrs. C., aged 42, a large, strongly-built woman, applied at the Boston City Hospital, June 27, 1884, because of failure of sight. She was in fairly comfortable circumstances, and since an attack of measles, when 14 years of age, had never been sick. She had been married twelve or fifteen years, but never been pregnant. Her catamenia had been regular till three years ago, when they ceased.

Some seven years ago her fingers and hands, and two or three years later her feet and the lower part of her face, lips, nose, and eyelids, began to increase in size. The enlargement gradually became greater, and for a long time she had been obliged to have her boots made for her, being unable to find any large enough. Her speech became somewhat thick and slow, and her movements slower than formerly. Except for an occasional feeling of numbness in the parts affected, and of burning in the feet and legs, there had been no special discomfort. Of late, however, she had experienced slight dyspnœa on active exertion. Failure of sight was first noticed a year and a half ago, and had continually progressed. Careful enquiry failed to elicit any history of pains anywhere. She had never had headache. There had been no failure of intelligence or memory. Her appetite was good, bowels somewhat sluggish, micturition normal. She slept heavily.

The lower part of the face was full, heavy, of waxen hue, the natural folds obliterated; the lips full; the nose large, its alæ broad and thick; the eyelids baggy. The hands and fingers were large and square, the thickening being most pronounced on the palmar surface, where the tissues could be pinched up in thick folds, and gave the feeling as of an excessive development of subcutaneous fat. The feet were very large and broad, the swelling not extending above the ankles, and although there were large varicose veins of the right leg, there was no pitting here or elsewhere. The tongue was large and rather pale. The skin was not dry to the touch, but she stated that she never perspired. The thyroid was of normal size. Auscultation revealed nothing abnormal in heart or lungs. Temperature and pulse were normal. The patellar-tendon reflex was present. There was no anæsthesia of the skin. The urine was normal in every respect.

Examination of the eyes ; conjunctiva, cornea, and iris to be normal. Movements good, R. only perception of light. L. V. $= \frac{20}{40}$; F. contracted in all directions, but to much greater degree upward and outward. Media clear. In both eyes the discs were sharply defined, gray with slight bluish tinge, without vascularity ; the central vessels, both arteries and veins, small ; in other respects the fundus normal.

Some weeks later the patient was admitted to the hospital, in the nervous and renal department, and remained for about a month. During this time her general condition remained the same, but the vision of the left eye varied somewhat ; on September 9th, it was $\frac{20}{70}$; the end of September, $\frac{20}{40} - \frac{20}{50}$. No further symptoms developed.

J. HIRSCHBERG (Berlin). The Electro-Magnet in Ophthalmic Surgery. *Veit and Co., Leipzig*, 1885.

This monograph of more than 150 pages, large 8vo., contains all that is known up to the present time concerning the use of the electro-magnet in ophthalmic surgery. The work is divided into three chapters, the first consisting of six pages of historical introduction, the second of 82 pages of Hirschberg's own magnet operations, and the third of 68 pages of the cases published by other observers.

The use of the magnet in the removal of foreign bodies is as old as the time of Fabricius, but, according to Hirschberg, our countryman, McKeown, of Belfast, was the first who actually succeeded in removing a splinter of iron from the vitreous by means of a magnet, and it is to his success that oculists are indebted for the present extended use of magnetism in the extraction of foreign bodies. McKeown used a peculiarly shaped bar magnet in his early operations, but has now, like the rest of the ophthalmic world, adopted the electro-magnet, the use of which has been popularised by Prof. Hirschberg and others.

In Chapter ii. the electro-magnet is described, and then follows a detailed record of all the operations which Hirschberg has undertaken with its aid. The fragments of iron were situated deeply in the corneal tissue in six cases, in the anterior chamber in two cases, in the iris in one case, in the lens in two cases, in the vitreous in twenty-four cases, and in the retina in two cases.

When the foreign body lies in the vitreous and it is impossible to probe with the magnet through the wound of entrance, Hirschberg urges immediate recourse to meridional section of the sclerotic and prompt use of the magnet. The sclerotic incision must naturally lie behind the dangerous ciliary zone, and the knife must be thrust in deep enough to reach the actual neighbourhood of the foreign body. The operation is carried out with antiseptic precautions, solution of corrosive sublimate being used to disinfect the conjunctiva, the wound, and the instruments.

In only two classes of cases does the author recommend the extraction of the foreign body from the vitreous through a corneal incision.—(1.) When the patient is young, the foreign body close to the lens, the cataract mature, and the eye not irritable. (2.) When the lens has been previously removed.

The results obtained by Hirschberg after the removal of fragments of iron from the vitreous were nominal sight in two cases, perception of light (ein Rest von Sehvermögen) in one case, merely the form of the globe preserved in two cases. That the iron in the two successful cases might have become encapsuled and have remained in the globe without producing inflammation is extremely improbable from what we know of the action of an oxidisable metal like iron in the vitreous, from Leber's important experiments (*vide* O. R., vol. iii., p. 332).

Besides his own successful cases Hirschberg quotes twelve others in which permanent restoration of sight was effected by the removal of a foreign body from the vitreous.

Chapter iii. contains notes of 125 cases to be found in ophthalmic literature, and forms a fitting conclusion to a very complete and interesting monograph.

The name of the author of the article on Optic Atrophy after Facial Erysipelas, abstracted in the April number, should read August Carl, instead of Karl August (*vide* pp. 105-6).

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(*Continued from page 139.*)

SECTION V. *Contagious Diseases (continued), Trachoma.*—This name is here used to mean both the papillary and the follicular forms of granular conjunctivitis, these, as already stated, being regarded as essentially one and the same disease.

It is certain that the disease is contagious, and that it is by contagion that it usually spreads; and though it is difficult to prove that it can arise in no other way, the weight of evidence goes to show that every case is the result of inoculation from another case. The contagion is carried in most instances by sponges, towels, washing-water, and the like—things which are used in common by many persons; the spread of the disease bears, therefore, a very close relation to overcrowding. The evil influence of crowded dormitories, especially, is shown by the fact that in schools the disease attacks the resident scholars much more frequently than the day scholars. Though it is by no means certain that the poison can be carried by the atmosphere, foul air has indirectly a strongly predisposing influence; confinement in impure air leads to catarrh of the conjunctiva and to hypertrophy of its follicles, and although these conditions never pass on spontaneously to trachoma, they render the eye much more susceptible to the contagion, if the latter be in the neighbourhood.

It has been supposed that trachoma first appeared in Europe during the wars of Napoleon, but there is evidence of its existence here for ages past—probably since the time of the Romans. The beginning of the present century witnessed, however, an extraordinary and most disastrous development of the disease throughout Europe, doubtless by reason of the long-continued wars which brought the armies of many nations into frequent and close contact with each other and with the civil population. The first epidemic of which we have records was that which attacked the army of Napoleon in Egypt, in which nearly the whole of his troops (32,000 men) and of the English soldiers in Egypt suffered. During the following twenty years the disease spread to nearly all the other armies of Europe. Thus, in the English army in 1818 there were more than 5,000 men invalided through blindness, due to trachoma. In the Prussian army, between 1813 and 1817, more than 20,000 men were attacked by the disease—150 were totally blinded in both eyes, 250 in one eye. In the Russian army, between 1816 and 1839, 76,000 men were attacked—654 were blinded in both eyes, 878 in one eye. At the present time the disease no longer occurs in this violent epidemic form amongst the soldiery, but it is still constantly present. Every year many of the recruits are attacked by it, and many return with it to their homes, and thus spread it among the civil population. A standing army is thus a constant source of trachoma.

Among marines trachoma has sometimes prevailed with even more severity than among soldiers, resulting in like manner from overcrowding. Mackenzie relates the instance of an outbreak on board a slave ship carrying 160 slaves and 22 sailors. One single sailor only of the whole number escaped; 39 of the negroes and 12 of the sailors were totally blinded.

Trachoma occurs more frequently in the middle period of life than in childhood or old age. It is much more common among the lower classes than amongst the well-to-do; doubtless because of the want of cleanliness which goes with poverty. To the same cause probably is to be ascribed its especial prevalence amongst certain races, *e.g.*, the Irish, Jews, Finns, and some Eastern nations.

Climate, apart from other conditions, appears to influence its spread considerably. In Europe the more Eastern lands are the most affected. It prevails in Russia, Turkey, and Greece. The Eastern provinces of Austria suffer more than the Western. In the mountainous district of the Tyrol the disease is almost unknown. In Germany a similar difference is observed from east to west. In the upper districts of the

Rhine, especially in Switzerland, it is very uncommon; it gradually increases in frequency along the course of the river, and becomes extremely prevalent in Holland and the adjacent country of Belgium. In France it is for the most part not common; in Spain commoner; in Italy still more so. Of Northern countries, Finnland is the most affected; Norway and Denmark less so; Sweden hardly at all. It is present in most parts of Great Britain, and is especially prevalent in Ireland.

Beyond the confines of Europe, the North of Africa is the special home of trachoma. In certain parts of Algeria nearly the whole of the inhabitants suffer from it, and in Egypt it prevails very severely, diminishing in severity, however, towards the south. In Nubia, in Central Africa, and at the Cape it is uncommon. It prevails throughout nearly the whole of Asia, being very common in Arabia, India, China, Japan, and even in Siberia. The same is true of the Polynesian Islands and of Australia, excepting the Anglicised parts of the latter, in which it is not common. In North America it prevails more in the Western than in the Eastern States. In Mexico and South America it is extremely prevalent, except in La Plata.

The apparent difference in liability to the disease which different races present is to a large extent dependent not upon race but upon habits of cleanliness and the reverse, but it is not entirely so, for the negroes in North America, who certainly are not cleaner than the whites, show a special immunity.

The amount of actual blindness caused by trachoma is represented by from two to nine per cent. of all cases of blindness, according to the statistics of different observers, but this indicates but a very small fraction of the evils which it causes, for a very large number of those affected, though not absolutely blinded, are incapacitated for work for years.

The prevention of trachoma implies protection of the healthy from contagion and treatment of the diseased. It demands separate consideration in relation to the army, to public institutions such as workhouses, schools, hospitals, &c., and to the general public. The following are the most important means:—

Regulations for the Army.—(*a.*) In countries in which trachoma is prevalent :—

In recruiting, all sufferers from trachoma other than of the milder types should be rejected ; those accepted should be placed at once under treatment.

In barracks the space for each man must be at least twenty-five cubic metres (= about 880 cubic feet). The rooms must be well ventilated, and at least once in the year emptied for fourteen days and fresh whitewashed.

Each soldier should have his own washing basin and towel, and where possible running water should be used for washing.

Medical inspection of all the men with regard to the state of their eyes should be made every week, and of every man going on or returning from leave. Leave should not be granted to an affected soldier.

The severe cases should be sent into hospital and treated in special wards ; the milder cases separated as far as possible from communication with the unaffected men.

No affected soldier should receive his discharge from service until he is cured.

For countries in which there is little trachoma similar regulations are desirable ; except that, in recruiting, *all* such cases should be rejected, and that the systematic inspection of the eyes need not be more frequent than once a month.

Regulations for Public Institutions.—It is chiefly in institutions in which large numbers of persons reside that precautions against trachoma are necessary, viz., in hospitals, asylums, schools, workhouses, prisons, and other places of like kind. The following are the essential points :—The rooms, especially the dormitories, must have ample cubic air-space and good ventilation. The inmates should wash in running water, or, in default of this, each must have a separate basin, and above all a separate towel ; each new-comer must be submitted to medical inspection with regard to the state of his eyes. In districts where trachoma is common such inspection must be systematically repeated at short intervals. Those found to be affected with trachoma must be separated from the rest, and where trachoma is common each class of institution should have connected with it a special establishment set apart for the reception of such cases. Where the evil is of smaller magnitude and complete separation is impossible, it may be sufficient to find a separate dormitory for the affected persons, the chief danger of contagion being certainly in the sleeping rooms. Persons suffering from trachoma should not receive their discharge until they are cured, but should, if possible, be passed on to convalescent homes, where their cure may be expedited by pure air. Medical officers of schools should make it a part of their regular duty to examine the scholars for trachoma, to separate the affected, to see that all such are placed under efficient treatment, to exercise control as to their return to the schoolroom, in case of epidemic to order the closing of the school, and to report on the matter at stated periods.

Regulations for the Population at large.—As has already been done in relation to several infectious diseases, compulsory notification of trachoma, or at least of cases accompanied with profuse secretion, should be introduced. The official medical inspector should, on receipt of such notification, visit the dwelling of the affected person, examine the other members of the family, and explain the dangers of contagion and the means to be adopted for its prevention: for cases with much secretion the power to compel the sufferer to place himself under efficient treatment is much to be desired.

Diphtheritic Conjunctivitis.—The sufferers from this disease are, in the majority of cases, children under ten years of age. The cases may be divided into two groups:—(*a*) Those in which an ordinary conjunctivitis, such as the catarrhal form which accompanies measles and scarlatina, or the purulent form of infants or adults takes on a diphtheritic character: these are usually the milder cases; they occur sporadically; their dependence on diphtheritic contagion is less positive than in the second variety, but they are met with chiefly in districts where diphtheria is present and during epidemics of the disease. (*b*), Cases occurring epidemically, definitely due to diphtheritic poison, and very often associated with diphtheria of the throat and with severe constitutional symptoms; these are the severer cases; the life as well as the eyesight of the patient is often in danger.

Like trachoma, the disease shows a preference for certain districts; thus it is especially common in the North of Germany, while in Middle and South Germany it is seldom met with. Among seven German cities furnishing statistics on a large scale Königsberg shows the largest proportion of cases of diphtheritic conjunctivitis, viz., 6·2 per thousand cases of eye diseases of all kinds; Utrecht shows 2·3, Vienna 6·2, Paris 0·4, London 0·2 per thousand, respectively.

Apart from danger to life, the disease is highly dangerous to the eyes; it appears that among a hundred cases, from twenty to thirty eyes, in round numbers, are totally blinded by it, and many more seriously damaged.

The prevention of the disease demands even greater care than the prevention of purulent ophthalmia, for the infection occurs without direct transmission of the secretion. The isolation of the infected child from other members of the family is of first importance; and in the case of poor people where this can hardly be accomplished, treatment in hospital in special wards set apart for such cases is urgently necessary. Great care as to contagion is necessary on the part of the medical attendants and nurses. In an epidemic in a children's hospital in Vienna, the whole of the assistant medical staff and eleven nurses occupied in the wards in question acquired conjunctivitis, which fortunately, however, proved of mild type, and did no permanent mischief. When one eye only is affected the fellow is to be completely occluded by a bandage. In one case in which free secretion was already present the disease was cut short by brushing the conjunctiva with a one per cent. solution of carbolic acid, and then completely occluding the eye with carbolised compresses.

SECTION VI. *Occupation in relation to Disease of the Eye.*—Among the diseases other than traumatic which are referable to particular kinds of occupation, myopia is the most important. Myopia is the professional disorder of the learned; it belongs also, to a less extent, to all handicrafts which involve prolonged and accurate looking at near objects. Cohn found myopia among watchmakers in 9·7 per cent.; among gold and silver workers in 12 per cent.; among lithographers in 45 per cent.; among compositors in 51 per cent. Tscherning grouped 7,523 persons examined by him in six classes, according to the demands which their several occupations made upon their eyesight, and found that the myopia rose from 2 per cent. in the lowest class to 32 per cent. in the highest. That watch-making and some allied occupations involve a comparatively small tendency to myopia is probably due to the frequent use of the monocular lens or loupe, and this indicates the way in which this danger is to be avoided in fine near work of all kinds. The general conditions as regards lighting, &c., under which such work should be carried on are the same as have already been described for schools (p. 94). Much improvement is to be desired in some of these matters in the older factories and workshops.

Amaurosis from lead poisoning, and the nystagmus of miners belong to the group of non-traumatic professional disorders. The former has already been discussed (p. 104); the latter is hardly to be reckoned as a cause of blindness, and is therefore not considered here.

Abscess of the Cornea (Hypopyon Keratitis, Serpiginous Ulcer) stands midway between spontaneous and traumatic disorders. It usually originates in some slight injury, but owes its further development to other agencies, especially to the presence of unhealthy secretions in the conjunctival sac, and to atmospheric influences, especially great heat. It is most common in the month of August, least common in December. It occurs often among reapers, who work during the hottest days of the year, and who, moreover, are much exposed to slight scratches of the cornea by ears of corn. Hirschberg found that it constituted ·5 per cent. of all cases of eye disease. It is commoner among country people than among dwellers in towns. Among the former, Martin found it to be the cause of no less than 67 per cent. of all cases of blindness, while among the latter it accounted for not more than from 8 to 10 per cent. The reason of this difference probably lies in the frequent occurrence of abrasions of the cornea by thorns, ears of corn, &c., the frequency of chronic conjunctivitis, and the neglect of slight injuries, among country people. A prompt and energetic treatment is imperative in these cases.

Injuries of the Eye are a very frequent cause of blindness—roughly speaking 10 per cent.—and, according to Cohn, they account for nearly one fourth of the cases in which one eye only is blinded. Of the cases of double-sided blindness due to injury, about one half are referable to injuries of both eyes, occurring simultaneously or independently; the other half to injury of one eye, followed by sympathetic disease of the other. Injuries which blind both eyes simultaneously are usually due to accidents incidental to the occupation of the sufferer, *e.g.*, powder explosions, burns with lime, &c., and are principally met with in men. The danger to the eyes is very different in different kinds of handiwork; in a statistical table given by Coccius the number of accidents occurring among locksmiths is more than twice as great as that occurring among any other class of workmen. Inexperience and want of skill constitutes the chief danger, as shown by the fact that in factories where children are employed they suffer in larger proportion than the adults, and that the frequency of accidents decreases in each successive life period.

Prevention of these disasters is possible chiefly in connection with those which are incidental to certain trades and occupations; thus, in manufactories and storehouses for explosive substances the strictest regulations with regard to the use of lights, smoking, and similar dangers should be enforced. Workers in metal and stone should, as a routine practice, protect their eyes by spectacles of glass, wire gauze, or other suitable material. The objection to all such protectors is that they become obscured by dust and moisture, and are consequently laid aside. At one time Fuchs adopted the practice of presenting a pair of protectors to every artisan applying at his clinique on account of a foreign body in the eye, but found that they were rarely made use of, even by those who, having already lost one eye through injury, might have been expected to value them. This being so, Government might fairly step in and make such protection of the eyes compulsory in those trades in which the danger is great, having as good a right to interfere in this matter as in certain other dangerous manipulations which are already compulsorily protected; it would then become a matter of course, and opposition would shortly disappear. Furthermore, insurance against injuries should provide for the use of such reasonable precautions as an essential to a valid claim. Government might also with good reason prohibit the sale of certain dangerous toys for children, *e.g.*, those of an explosive kind, such as cap guns and crackers and sharp-pointed projectiles for crossbows, peashooters, &c.

It is often the case that the preservation of an injured eye from blindness and the preservation of its fellow from sympathetic destruction will depend entirely upon a prompt application for treatment, but through the desire not to lose wages the workman will continue to work until the time for efficient treatment is gone by, and hence will become incurably blind. The evils arising in this way might be diminished by rendering it compulsory on all artisans to insure against accident; or by making the employer pecuniarily liable, under certain restrictions, for accidents to those in his employ The disinclination to desist from work until absolutely obliged to do so would then be diminished, and timely treatment of injuries would be more often obtained.

Sympathetic ophthalmia is almost certainly preventible by excision of the injured eye performed before its fellow is affected. The outbreak of sympathetic mischief *after* enucleation has certainly been observed, but the cases are proportionately rare, and the disease arising in this way is usually of exceptionally mild type—another proof of the value of early excision. The operation is distinctly preferable, for general use, to optico-ciliary neurotomy, as being easier to perform and more certain in its prophylactic influence. It should be performed in every case in which the eye is already blinded, or is certain to become blind, through an injury, and in which the possibility of future sympathetic mischief presents itself. It has often been asserted on the Continent that English surgeons proceed too lightly to enucleate the eye. The accusation is ill-founded. It is certainly better once in a way to remove an eye which might have been retained without harm, than to permit the occurrence of sympathetic ophthalmitis which might have been prevented.

SECTION VII. *Influence of Social Conditions.*—Diseases of the eye, like very many other diseases, are especially the companions of poverty and ignorance. As we descend the social scale, the number of blind persons in proportion to the population constantly increases. In this connection the following points deserve consideration:—

Education, by increasing the people's intelligence, promotes a timely attention to disease, and deters the sick from using the remedies, falsely so-called, of old women and quacks. It also removes the superstitious fear of operative treatment. With the advance of education the number of patients treated for diseases of the eye increases, because a larger proportion of those who are affected seek relief, but at the same time the number of blind persons in the community diminishes. Thus in England for every million of the population there were:—

In 1851, 1,020 blind persons.
In 1861, 964 ,, ,,
In 1871, 951 ,, ,,
In 1881, 879 ,, ,,

Cleanliness has a directly restraining influence on the spread of contagious diseases such as trachoma, and on the occurrence of catarrhal and scrofulous disorders.

Nutrition improves for the most part with the social position and in the same degree scrofulous diseases diminish; also those cases of chronic irido-choroiditis which are met with especially amongst elderly ill-fed persons.

Work.—The laws by which, of late, most European Governments in varying degree have limited the employment of children in factories have done much to diminish the number of cases of blindness from injury. Children not only suffer more in health and growth from such work than adults, but are far more liable to injury.

The Dwelling becomes healthier as the social position improves. A damp, crowded, ill-lighted, ill-ventilated dwelling predisposes in ways already pointed out to eye diseases.

Lighting.—The eyes are used with more ease and safety by daylight than by any kind of artificial light. An ample supply and a good distribution of day-light should be striven for in all work-rooms, shops, and offices. The best arrangements for lighting have been discussed in connection with the hygiene of schools.

Artificial light of sufficient intensity is obtainable in various ways, but not with equal advantage in all. As a normal standard of illumination may be taken, an amount of light by which fine print (Snellen 0.5) is easily legible by the healthy eye at a distance of half a metre, and this is stated to correspond with the light of twelve standard candles or even more. A too great intensity of light is never obtained provided that the source of light is not directly visible to the eye. Exposure of the eye to the direct rays, especially to those of the electric light, may produce very injurious dazzling and congestion of the eyes. A permanent central scotoma has been known to follow an incautious gazing at the electric lamp.

To diminish such dazzling, ground or opal glass may be used, though at a sacrifice of from 30 to 60 per cent. of the brilliancy. The most satisfactory arrangement is that by which the flame is completely removed from sight, and a diffuse reflected light alone perceived, and this is possible not only with the electric light (*vide* p. 95) but with gaslight also. Steadiness of the light is important; to work by a flickering light is highly fatiguing. Naked gas flames, and most of all the ordinary batswing, are always unsteady, and are objectionable on this account. The electric light also is often unsteady, but this may be completely avoided by improved construction of the machinery.

All forms of artificial light contain, as compared with daylight, an excess of rays of long wave length, that is, they are of yellowish hue. Even the electric light, which looks blue by the side of gaslight, is yellow as compared with daylight. Meyer gives the following proportionate constitution for three kinds of artificial light:—

	RED.	GREEN.	BLUE.	VIOLET.
Electric light ...	2	1	0·8	1
Petroleum ...	3	0·6	0·2	0·1
Gas	4	0·4	0·2	0·1

The highly yellow tint of gaslight may with advantage be modified by means of blue glass cylinders.

As regards heat-giving property, which to the eyes may become a source of injury, the ordinary means of light production differ greatly. The electric light emits the smallest amount of heat, gas the most, petroleum lies between the two. For the avoidance of the congestive effect of the heat given off by gaslight, the flame should be at least one metre distant from the head.

As regards impurity of the air from products of combustion, electric light has the great advantage of causing none. For equal amounts of light gas gives off more impurity than petroleum.

From the hygienic point of view, therefore, the electric light has distinct advantages, provided always that the actual source of light be screened from view. The air remains unsullied and unheated; as compared with what obtains in the case of gas the acuity of vision and the perception of colour are about double. Petroleum has, over gas, the advantages of giving a whiter light, less heat, and less impurity, and of being considerably cheaper. It has the disadvantage of a liability to cause smoke and smell unless very carefully regulated. Gas has the one great advantage of convenience in arrangement and management.

(To be continued.)

VOSE SOLOMON (Birmingham). The Prevention of Blindness from Ophthalmia Neonatorum among the indigent poor.

Mr. Vose Solomon sends us the following extract from a paper to be read by him before the Staffordshire Branch of the British Medical Association. It will be read with especial interest in connection with the recent action of the Ophthalmological Society (O. R., Vol. III., pp. 120—218, and Vol. IV., pp. 56—116, &c.), and with the chapter dealing with the same subject in Professor Fuchs's work on the Prevention of Blindness (O. R., Vol. IV., p. 131, &c.):—

The destructive results of Ophthalmia Neonatorum, where treatment has been delayed or altogether omitted, are well known; our Blind Asylums are full of sad illustrations. It is true that in some of these cases the loss of sight depends largely upon the presence of that most serious complication, congenital syphilis, in others upon artificial feeding or some other influence interfering with the nutrition of the body; but the essential and main cause is the inoculated disorder of the eye itself.

The Ophthalmological Society of Great Britain has recently addressed itself to the Local Government Board with the suggestion that cards setting forth the danger of the disease, and advising early resort to a doctor, should be distributed under the authority of the Board in all Poor Law Unions. The Board declined to entertain this suggestion on economical and other grounds. The Society has since determined to approach the Board a second time with a modified, simpler, and less expensive plan of diffusing information on the subject, viz., that in certain public places—offices where parish medical notes are issued—notices should be put up warning mothers of the blinding nature of infantile purulent ophthalmia, and advising immediate application in such cases. Whether this suggestion, good as far as it goes, will meet with more favour from the authorities than its predecessor remains to be seen (*vide* pp. 183-4).

Those who have an intimate knowledge of the habits of the pauper class know how prone they are to delay seeking medical aid even in cases of obviously serious illness, and also how great are the obstacles to so doing incident to poverty, even where the will is good. Another hindrance which sometimes stands in the way of proper treatment is the influence of old crones and other ignorant advisers and their nostrums.

My opinion is that the best way to meet these difficulties is to supply the mother, prior to her confinement, with the materials for an eye-lotion, together with all necessary directions for the management of the ophthalmia until qualified medical assistance can be obtained. I do not propose to apply to Government authority, but to Boards of Guardians, Union doctors, and managers of Maternity Societies connected with the Churches. My plan is so simple that possibly it may excite a smile, but I hold that its very simplicity will ensure its success. We know that many cases may be much relieved, and the transparency of the cornea preserved, by frequently cleansing away the matter, and washing the conjunctiva with an astringent even so simple as green tea. I suggest that every note issued for the parish midwife shall be accompanied by a packet containing *sixty grains of alum* and bearing a label reading as follows:—

"LOTION-POWDER FOR THE BABY'S EYES. *Directions.*—Dissolve this powder in a pint of clean water. Directly you see matter come from the baby's eye, clean it away every two hours with a bit of wool or rag, and then thoroughly wash the inside of the eyelids with the lotion. If the eye looks weak and does not matter, use the lotion every four hours. Get a doctor as soon as possible. Eyes that matter, if neglected, often go stone blind."

My belief is that by giving the poor a drug to handle and make use of, together with a statement setting forth the dangers of the ophthalmia, will tend to induce an intelligent attention to the disease and its treatment. The fact that the powder consists of alum will soon be discovered, and the parson and the district visitor, and others instructed thereby, will aid the profession in stamping out this common form of blindness, due to neglect of purulent ophthalmia among the indigent poor.

W. Uhthoff (Berlin). A Case of Paralysis of all the Ocular Muscles after Diphtheria. *Neurol. Centralbl.*, 1885, *No.* 6, *p.* 125.

E. Mendel (Berlin). Diphtherial Paralysis, with Autopsy of a Case in which all the external Ocular Muscles were involved. *Neurol. Centralbl.*, 1885, *No.* 6, *p.* 128.

Ocular paralysis is a not unfrequent sequel of Diphtheria, occurring probably in ten to fifteen per cent. of the cases. The number attacked in different epidemics, however, varies greatly, and it is more common in adult cases. As we seem to have been passing through an epidemic in which the paralytic lesion is comparatively common, we shall give a full abstract of the above important cases, with a reference to the recent literature of the subject.

By far the most common ocular paralysis associated with diphtheria is cycloplegia, which occurs as a rule from four to six weeks from the onset of the disease, preceded generally by paralysis of the velum palati during the second or third week. Iridoplegia and paralysis of the external ocular muscles are less common, although not rare; but, so far as we can discover, the cases described by Uhthoff and Mendel are the first recorded of general ophthalmoplegia in diphtherial paralysis.

Uhthoff's case was that of a boy ten years of age, who had been treated for a mild attack of Diphtheria from September

1st to September 17th, 1883, and was then considered well except for nasal voice indicating paralysis of the soft palate. Towards the end of September he became unable to read, and on October 6th, when he first came under observation, he was found to have well-marked paralysis of accommodation, but with perfect reflex pupillary action, good movement of the globes, and normal condition of fundi (Hm = 2D. V = 1). On October 16th accommodation had slightly improved, from Sn x to Sn vii½, but R. now showed complete ophthalmoplegia externa, L. the same except slight action of the external rectus. There was slight double ptosis, but with effort both lids could be raised completely. With suitable lens V. was perfect as before except for binocular diplopia. Convergence and associated pupillary contraction were completely abolished, but reflex pupillary action to light was quite prompt. The staring condition of the eyes had been noticed on October 10th by the patient's mother, along with difficulty in walking. The knee jerk now examined for was absent, and remained so till the end of the illness. On October 23rd the accommodation had still further improved, so that the finest type could be read at 15 cm., the extrinsic paralysis remained as before, but the weakness of the lower extremities, the upper limbs remaining practically intact, had increased so that the patient could scarcely walk without support. On October 27th accommodation had completely recovered, and certain globe movements were now possible, viz., downwards (inferior recti) and to the left (left ext. rectus and right int. rectus). Slight convergence with associated pupillary action was also present. On November 1st, the above-mentioned movements having increased, there was now slight upward movement of both globes. Conjugate movement to the right was first possible on November 5th. On November 17th, except slight restriction of the lateral movements, the ophthalmoplegia had disappeared. The motor weakness of the lower limbs began to improve from November 5th, but the knee jerks did not return till the middle of January, 1884. No sensory disturbance had been present throughout.

Mendel's case ended fatally, and the interest is very largely pathological. The patient was a boy of eight years, treated for diphtheria of medium severity from September 22nd to September 28th, 1883. On October 4th paralysis of the velum palati occurred, and on November 2nd visual disturbance and weakness of all four extremities. On November 5th Professor Hirschberg found double ptosis, more marked on the right side. On the R. there was paresis of ext. rectus, and paralysis of int. rectus with paresis of superior and inferior recti; on the L. there was paresis of all the recti muscles. No paralysis of accommodation or limitation of visual field. Into the details of the general paralysis we need not here enter, except to say that there was paresis of the facial muscles, of the velum and uvula and of the muscles of the neck, with slight ataxy of both upper and lower limbs and absence of the deep reflexes. No sensory changes. The pulse was 100, temperature 38°C., and there was a small amount of albumen in the urine. On November 11th, that is, ten days from the presumed onset of the ocular paralysis, the patient died, apparently from paralysis of respiration.

Only the brain was examined *post mortem*. To the naked eye it showed no abnormal changes, but with the microscope Mendel found both central and peripheral changes. The central changes consisted of marked capillary congestion from the anterior corpora quadrigemina to the decussation of the pyramids. with exudation of red and white blood corpuscles in the perivascular spaces, and small capillary hæmorrhages at various spots, one of them in the course of the right sixth nerve within the pons. There was no plugging of vessels and no alteration of vessel walls. In the nuclei of the third, the sixth, the vagus, and the hypoglossal nerves no definite changes were discovered except that the ganglion cells of the oculomotor nucleus seemed large and swollen—the first stage, Mendel believes, of a myelitis. The peripheral changes were those of an interstitial and parenchymatous neuritis; the first indicated by marked increase of the endoneurial nuclei, especially in the vagus and the abducens nerves, the second by irregularity in calibre of the axis cylinders and increased affinity of the medullary sheaths for carmine.

A full digest of the literature of Diphtherial Paralysis will be found in a contribution to the pathology of the disease by Percy Kidd (Med. Chir. Trans., 1883, Vol. LXVI., p. 133), and in an admirable paper by Arthur H. Benson, of Dublin, on a case of Ocular Paralysis after Diphtheria (Ophthal. Soc. Trans., 1883, Vol. III., p. 265). It will be seen that there are three fairly distinct opinions as to the pathology of Diphtherial Paralysis. The oldest, that of Charcot and Vulpian (Compt. Rend. de la Soc. de Biolog., 1862), attributes it to an ascending neuritis from the local lesion. The second, that of Buhl (Zeitschr. für Biologie, 1867), attributes the condition to vascular changes, capillary hæmorrhages and exudations, both in the brain and around the roots and ganglia of the spinal nerves. In association with this view, Mendel states that Œrtel and Klebs have both found micro-organisms in the vessels in relation with the hæmorrhages, these observers, however, not agreeing as to the nature of the organisms. The third view, that of Déjerine (Arch. de Physiolog. norm. et patholog., 1878, p. 107), finds the cause of Diphtherial Paralysis in a subacute poliomyelitis involving the motor cells of the anterior horns, and their homologous nuclei, with a secondary peripheral neuritis. Déjerine also found central hæmorrhages, but considered them secondary to the inflammatory process.

Mendel believes that the affection is due to two causes combined, namely, central capillary hæmorrhages and a primary peripheral neuritis, the nuclei of the inflamed nerves being normal. We must confess to some hesitation as to the evidence given by Mendel of peripheral neuritis. One point, for example, on which he lays considerable weight, the deeper staining of the central as compared with the circumferential fibres of the third nerve, has much the appearance of an artificial result which would be absent from the fifth nerve, for example, owing to the looser texture of that nerve.

Abercrombie, in a paper read before the International Medical Congress, 1881, gave considerable support to the views of Déjerine, without, however, finding any central hæmorrhages in the seven cases recorded by him.

The bulk of opinion seems to be in favour of the view that Diphtherial Paralysis is due to an anterior poliomyelitis of low degree, in which there may or may not be capillary hæmorrhages. If we mistake not, this is now the view accepted by Hughlings Jackson.

The case recorded by Uhthoff is one of extreme importance as bearing on the central origin of the disease. It will be noted, as Uhthoff remarks, that the order of recovery is what we might call a physiological in place of an anatomical one, associated muscles recovering together, first the inferior recti, then the muscles engaged in conjugate deviation to the left, then the superior recti, and last of all the muscles which produce conjugate deviation to the right. This, along with the fact that the pupillary reflex to light was normal throughout, will be admitted as strong clinical arguments for the central origin of the disease. A myelitis, for example, destroying temporarily the function of the R. Abducens nucleus would produce not a convergent strabismus of the right eye, but a conjugate deviation of both eyes to the left. Again, a selective myelitis such as that of diphtheria evidently is, may readily interrupt the cortical fibres which, according to Erb's account of the pupillary innervation, govern convergence and its associated pupillary contraction, while in no way interfering with reflex pupillary action.

The occurrence of paralysis is as little dependent upon the severity of the diphtherial attack as the occurrence of nephritis is upon the severity of a scarlatinal attack. Indeed, many cases, and these, as Nettleship mentions, generally hypermetropic persons, come to the ophthalmic surgeon with no definite history of diphtheria. Some of them, as Buzzard has shown (Diseases of the Nervous System, p. 315), may closely resemble tabes dorsalis, just as tabes may resemble diphtherial paralysis. The cycloplegia and paralysis of the velum with the history of these cases will usually prevent mistake.

Cases of Diphtherial Paralysis usually recover, but it should be borne in mind that they sometimes die—perhaps twelve per cent.—and die suddenly. The causes of death are various, but in a recent unpublished lecture Hughlings Jackson strongly emphasised as one of the most alarming symptoms an abnormal slowness of the pulse. In such cases the patient should at once be put in bed and kept in bed, and stimulants administered with belladonna as recommended by Dr. Abercrombie. In these cases, and in those that die with symptoms of respiratory paralysis, the lesion probably is a myelitis affecting the cardiac and respiratory centres, and if we can keep the patients alive there is every reason to expect that they will recover. Mendel, however, in the above-mentioned paper refers to three cases of hemiplegia after diphtheria, the suddenness of which pointed distinctly to hæmorrhage or embolism, and he believes that some of these cases of sudden death in diphtherial paralysis are due to hæmorrhage in the medulla oblongata.

E. Landolt (Paris). The Amplitude of Convergence.

Arch. d'Ophthalmologie, Vol. V., p 97.

In order that true binocular vision may take place, there must not only be a certain degree of definition of the images formed in both eyes, but also a proper centreing of these images on the macula of each eye. This centreing only takes place when the visual axes cross at the point of fixation. The term convergence is used by Landolt to signify the simultaneous direction of the two eyes on the point from which rays emanate or appear to emanate; it applies, therefore, to any position of the eye in which binocular vision is possible. Convergence is measured in metre angles according to the notation of Nagel.

The *maximum* of convergence is given by the nearest point which can be fixed binocularly, any nearer approach giving rise to crossed diplopia; the *minimum* by the least convergent or most divergent position which the eyes can assume and still maintain binocular vision. The minimum is generally a slightly divergent position, so that its measurement in metre angles is negative. The *amplitude* of convergence is the difference between the maximum and minimum.

The maximum is easily determined. To find the minimum it is usually necessary to make use of prisms, bases inwards, from the strength of which the degree of negative convergence can be deduced. The deviation equals half the angle of the prism, and for an interocular distance of 58 mm. 1 metre angle corresponds to a prism of $1\frac{2}{3}°$; consequently if X be the number of the prism in degrees, the deviation is $\frac{X}{2\frac{5}{3}} = \frac{3\,X}{10}$ Placed before one eye a prism of X degrees corresponds to a deviation of each eye $= \frac{3\,X}{20}$ when the interocular distance

= 64 mm. the expression for the deviation becomes $\frac{3X}{22}$ If the interocular distance is not measured, a sufficient approximation for the deviation of each eye produced by a prism of X° is given by the formula $\frac{X}{7}$; thus prisms of 4° in front of each eye which are the strongest that can conveniently be used, produce a deviation of from 1·1 to 1·2 metre angles. In testing the minimum of convergence, the prism placed in front of one eye, with the base directed inwards, is increased in strength until homonymous diplopia arises, and the value of the metre angle deviation deduced by means of the above formula.

The normal state of matters has been found to be pretty much as follows: Minimum of convergence = – 1 metre angle (a.m.); maximum of convergence = 9·5 a.m.; amplitude of convergence = 10·5 a.m.

The state of refraction of the eyes exerts but little influence on either the amplitude as a whole or its component values; only when the ametropia is excessive is there apt to be defective amplitude. In the normal state the proportion of the negative to the positive portion of the convergence varies from 1:9 to 1:20. A high degree of negative convergence by no means implies diminution in the degree of the positive factor, although in certain pathological conditions there may be insufficiency of the externi or interni, with preponderating action of the antagonists.

The use of the eyes at near distances necessitates three or four metre angles of convergence; there is, therefore, generally a large surplus of convergence available, and this reserve of muscular power appears to be necessary in order that the prolonged fixation of near objects may be accomplished without fatigue. According to Landolt, the proportion of convergence in reserve should amount to $\frac{2}{3}$ to $\frac{3}{4}$ of the positive portion of the whole amplitude; when this is not the case muscular asthenopia must result. Thus, in order to work constantly at a distance of $\frac{1}{3}$ metre, 9 a.m. at least are required; so that we may arrive at the diagnosis muscular asthenopia when in such a case, for instance, the examination shows the patient to be only capable of 8 a.m., 7 a.m., or less of convergence.

The different ways in which such a case may be treated are :—Firstly, the holding of the object fixed further from the eyes, the effect of which, however, is not great unless, of course, the distance is very considerable, when it becomes at the same time too great for reading small type, etc. Secondly, the use of prisms which as we have seen when worn the full strength practicable, viz., 4° in front of either eye makes little more than 1 a.m. difference. Thirdly, the combination of the first and second means, which in some cases when the deficiency is not marked is sufficient. Fourthly, tenotomy of one or both externi; here the practical difficulty is that the positive amplitude can only be increased to the extent of the negative, which is seldom sufficient in amount to make it worth while, although the negative portion may be reduced to 0 without any harm. Lastly, the advancement of one or both interni; here, though theoretically the same holds good as with respect to the treatment by tenotomy of the antagonist, still the ultimate effect is often vastly greater than would be expected. A case is given where with amplitude of convergence = 5·5 a.m. and consequent asthenopia, the negative portion being 0·5 a.m., advancement of one internal rectus resulted in the acquirement of 14 a.m. and a cure of the asthenopia. GEORGE A. BERRY.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, MAY 14TH, 1885.

JONATHAN HUTCHINSON, F.R.S., President, in the Chair.

Reported by DAWSON WILLIAMS, M.D.

Prevention of Ophthalmia Neonatorum. — The President announced that Mr. George Russell, M.P., on the part of the Local Government Board, would receive a deputation on May 15th, in order to learn the views of the Society on the subject of the prevention of blindness from ophthalmia neonatorum. (*Vide* pp. 183-4.)

Living Specimens.—Rupture of Eyeball.—Mr. W. H. Jessop showed a child, aged eight, who had suffered a compound rupture of the eyeball in February. The interest of the case was the rapid and complete recovery, with useful vision. In reply to Mr. Nettleship, who observed that there was no trace of a scar, Mr. Jessop said that the rupture in the sclerotic was only about three or four lines in length, though that in the conjunctiva was large, and needed three sutures.

Symmetrical Coloboma.—Mr. Jessop also showed a case of posterior coloboma of the choroid in both eyes on the temporal side of the disc. The lens, on both sides, contained striæ.

Tumour of Ciliary Region.—Mr. M. McHardy showed a woman, aged fifty-four, who in July, 1884, presented a multilobular growth of a dark purplish red colour, resembling somewhat a mulberry in form and colour, growing from the sclerotic in the ciliary region on the outer side of the right eye. The growth was removed, but a small globular dark red tumour had since recurred in the same situation. No microscopical examination had been made. This omission would be supplied.

Fat in Upper Eyelids.—Mr. M. McHardy showed a girl, aged sixteen, in whom there was a great development of fat in the upper eyelids, causing much deformity. He had excised an elliptical piece of the upper lid, and a large mass of adipose tissue; this afforded some relief. In reply to Mr. Nettleship, Mr. McHardy said that, to the best of his belief, the fat lay above the orbicularis, and was, therefore, not intraorbital.

On the Condition of the Ciliary Nerves in certain Diseases of the Eye.—Dr. W. A. Brailey read a paper founded on examination in ninety cases of the long ciliary nerves, usually of both the inner and outer sides, by sections taken at right angles to their course in the sclerotic. Being cases of excision for disease, the morbid process had been in every case severe, and, in most, of considerable standing. In primary glaucoma (thirteen cases) the nerve was, in some cases, perfectly normal, but in about 22 per cent. there were indications of neuritis, the changes being, however, usually so slight as not to be incontestable. In a larger proportion (50 per cent.) the nerves were swollen, their axis-cylinders being large and indistinct, or not visible at all. It was observable also that the average size of these nerves in eyes with glaucoma, whether primary or secondary, was considerably (almost 50 per cent.) beyond that associated with normal tension. This enlargement was probably due to swelling of the nerve-fibrils, as it is found even where the microscopical structure appeared quite normal. It produced considerable absorption of the sclerotic through which the nerve passed, so that this condition was indicated, especially in the case of the nerve of the inner side, by a wide dark bluish streak, corresponding to the course of the nerve. In eyes exciting sympathetic disease, the nerve itself was usually normal in structure, though it might show slight traces of neuritis ; but inflammation round the artery and nerve, more marked round the former, was found in the great majority of cases (85 per cent.). In the sympathetically affected eye it was also found, though not quite so commonly (66 per cent.) ; but three cases of sympathetically produced inflammation, however, were examined. In uveitis serosa, independent, however, of any relation to sympathetic disease, inflammation round the artery and nerve also occurred, spreading evidently from the former to the latter. In the five well-marked cases of suppurative panophthalmitis that had been examined, the condition was similar to that found in the eyes exciting sympathetic disease, except that the inflammation around the artery and nerve was well marked in every case. In other conditions, such as iritis and irido-choroiditis of various origin, the condition varied, inflammation in and around the artery and nerve being occasionally found, though far more often absent. In a case of non-suppurative iritis occurring after an iridectomy preliminary to cataract-extraction, and in another, with changes like those of progressive myopia, that is, disseminated choroiditis at the posterior pole and posterior staphyloma after leucoma adhærens, there was, round the artery, much inflammation, which had extended into the corresponding half of the nerve. It was inferred, from the above observations, that inflammation of the ciliary nerves was not the means by which sympathetic disease was transmitted; also that inflammation round the nerves and their companion arteries was equally ineffective in this sense, as it occurred at least as strikingly and as commonly in suppurating eyes. The corneal anæsthesia found in absolute glaucoma was explained by the degeneration of the elements of the nerve, which, together with the other changes noted in this disease, appeared to be secondary to the mechanical pressure upon them. Mr. Nettleship observed that De Wecker had argued that the fact that serous iritis affected both eyes was the best evidence that sympathetic inflammation travelled along the optic nerves, from one eye to the other. He also asked whether in episcleritis Dr. Brailey had ever observed any evidence of transmission of the inflammatory process back to the optic nerve. Dr. Brailey replied that he quoted serous iritis merely because it was generally considered in this country not to be due to sympathetic action; he had never noticed that the disc had become involved as a sequence of episcleritis, but he had never made a careful search for it.

Disappearance of Diabetic Cataract.—Mr. Nettleship said that his attention had been especially directed to the fact that diabetic cataract occasionally disappeared, by a paper by Dr. Tannahill, published in the *British Medical Journal*, January 31st, 1885, page 226. The spontaneous disappearance of opacity, which was, of course, quite a different thing from absorption of an opaque lens, was an extremely rare event; only two other cases were on record, both by Seegen. The first case was a man, aged thirty-nine. When he came under observation, about six months after symptoms of diabetes had been first noticed, he was much emaciated, and the lens in both eyes was cataractous. Under treatment at Carlsbad, the quantity of urine diminished, and, simultaneously, the crystalline lens cleared, and vision improved. The quantity of sugar did not diminish. The improvement in the patient's general condition did not last long, and the lenticular opacity also recurred before death. The second case observed by Seegen was a woman, aged fifty-five; after symptoms of diabetes had been present for some time, her sight became so bad that she could not read; under treatment for diabetes the lens gradually cleared, and sight returned. The cases supported the theory that the opacity of the lens was due either to the presence of sugar in the lens, or to the absorption of water from the lens.

The President said that congenital cataract in young rabbits sometimes cleared up.

Nævus of Choroid.—Mr. J. B. Lawford. Microscopical specimens. The patient, a child, aged eight, was brought to the hospital on account of pain in the left eye following a blow.

The mother did not know how long the eye had been blind. There was a capillary nævus of the left side of the face from the forehead to the chin. There were no nævi elsewhere. The left eyelids were involved, and presented a slightly puffy appearance. The right eye was normal; the left ocular conjunctiva was normal; the lens was opaque and yellow. The eye had no perception of light; T + 2; the left eye was excised. On examination, after removal, the choroid surrounding the optic disc, and for a distance of five millimetres to seven millimetres from its margin, was thickened (five millimetres to one millimetres), and spongy in appearance. Under the microscope this part of the choroid was seen to be traversed throughout by vascular canals varying in size; their walls were formed only by the choroidal tissue. A few dilated capillaries were also visible. Beyond the limits of the nævus the choroid was normal. There was an infundibular detachment of the retina. The lens was shrunken, and its fibres much disorganised. The iris was atrophied, and adherent to the cornea at the periphery.

Recurrent Paralysis of Third Nerve, associated with Migraine.—Mr. Simeon Snell. A little girl, aged 8, came under observation in November, 1883, with complete ptosis on the left side, divergence of eye, and general paralysis of the third nerve; fundus occuli normal; refraction hypermetropic, about 1.5 D. It was ascertained that she had had a failing of the left eye since cutting her "eye-teeth" at 18 months; since that time she had suffered from attacks of pain in the head and sickness, and at these periods the eye had closed; after the subsidence of the other symptoms, it commenced to open, and very gradually became widely open. These attacks had recurred about every six months. The severe part of one these illnesses had just passed when she was first seen. Another attack came on in July, 1884, and the eye-affection gradually passed away, as it had done before. On January 20th, 1885, she appeared at the infirmary with commencing drooping of the eyelid; it had begun the day before. Next day the condition was characteristic of migraine, the pain being confined chiefly to the left side, and over the left eye-brow. Ptosis was complete, as was the palsy of other muscles supplied by the third nerve; the pupil was a little dilated, and did not act to light or accommodation. Recovery gradually took place in the eye-symptoms. On April 30th the eye was fairly wide open, but not quite so widely as on the sound side; there was divergence, but, on effort, a good deal of power of convergence; movements upwards and downwards were extremely slight. The left pupil was about the same size as the right; it acted very slightly to light or accommodation. V. (corrected) = $\frac{10}{200}$, and J. 16. There was a distinct neurotic history on both parents' side. Reference was made to two similar cases described by Dr. Saundby, and also to one, mentioned by Dr. Buzzard in his "Clinical Lectures on Diseases of the Nervous System" associated, with facial tic.

Mr. Ernest Clarke said that he had under care a similar case; the patient, a boy aged 12, had attacks of migraine, accompanied by a paralytic affection of the third nerve on the left side; the attacks were marked by severe vomiting, constipation, brow-ague on the left side, and dimness of sight immediately after the attack; the left pupil was dilated, and there was extreme external strabismus, and slight ptosis; in three days, the ptosis disappeared, but the dilatation of the pupil lasted three weeks. The attacks occurred every six weeks.

Dr. Ormerod quoted the case of an elderly woman who gradually developed paralysis of the left third nerve without any symptoms of migraine; the symptoms disappeared in about three months. She had suffered from one previous attack. The pupils acted in accommodation, but not to light; the knee-jerk was present on both sides. He quoted a case resembling Mr. Snell's recorded by Thomsen of Berlin.

Reflex Ophthalmitis.—Mr. Jonathan Hutchinson said that when he was preparing his lectures at the Royal College of Surgeons he had supposed that "reflex ophthalmitis" was an example of inflammation excited by reflex action. From a further consideration of the facts, he had subsequently come to the conclusion that the nerves were directly involved; he held that there was much probability that all forms of inflammation could so contaminate the blood as to lead to a condition of that fluid which could, owing to the existence of a selective affinity, set up similar changes in tissues of the same nature as those primarily affected. In multiple periostitis, which might follow on injury to a single bone, it appeared probable that the bones subsequently affected suffered as a secondary consequence of the changes set up in the bone injured. The most plausible explanation of such an occurrence was that some elements, whether tissue-elements or bacteria was a matter of indifference, were shed into the blood ; the operation of selective affinity led to the affection of the same bones on the other side. The application of these facts to diseases of the eye was obvious. The wandering elements, shed into the blood from the eye in a condition of inflammation secondary to some injury, found themselves under similar conditions in the other eye, and were then able to set up similar changes in analogous tissues. He had believed that this speculation was original, until Mr. Nettleship had pointed out to him, a few hours earlier, that Berlin had published, in Volkmann's "Archiv" in 1880, a closely similar theory, only differing from the one now put forward in that Berlin assumed the existence of a bacterial poison.

The time for adjournment being passed, the discussion of this paper was postponed.

Ophthalmia Neonatorum.—A deputation of the Ophthalmological Society, headed by Mr. Jonathan Hutchinson, president, and Sir William Bowman, Bart., waited upon Mr. George Russell, M.P., Parliamentary Secretary of the Local Government Board, on May 15th. Sir William Bowman pointed out that about 30 per cent. of the inmates of the blind asylums lost their sight as a consequence of ophthalmia neonatorum, and that this disease could be effectively treated if taken in time. Mr. Russell repeated the objection, made by the Registrar-General last year, that if the Government interfered in regard to one disease of infancy, it might be called upon to adopt measures against others. Sir William Bowman replied that this disease ought to be ranked apart from others, occurring as it did in infants of so tender an age, so that it could not be legitimately compared with any other disease with reference to the claim for State interference. Mr. Hutchinson urged that, as the disease occurred chiefly among the poor, the poor-law organisation might be asked to issue a warning, and dwelt on the recommendations adopted by the Society at its meeting on March 14th. Inasmuch as these measures would only reach a small section of the poor, owing to the fact that many are attended in their confinements by midwives not connected with the parish authorities, and inasmuch as there was no system of certification of such midwives in existence, it was desirable that some further steps should be taken. The Society therefore suggested that the registrars of births should, when giving the certificate of vaccination to the person who registered the birth of a child, at the same time give a printed slip containing the above notice. The warning would be received too late for that particular child, but the parents might bear it in mind in the case of any subsequent child. The Registrar-General, who was present, threw cold water on the suggestions made, on the ground that it would throw additional and unremunerated work upon the registrars of births. Mr. Russell, on the other hand, said that he was impressed with the desirability of taking some such steps as those suggested by the Society, but added that the Local Government Board had no power to order boards of guardians to do anything, though these bodies generally showed great readiness in carrying out suggestions emanating from the Local Government Board. He promised to bring the matter before the notice of Sir Charles Dilke. The deputation included Mr. John Tweedy, Dr. McKeown, Dr. Brailey, and Dr. Abercrombie.—*British Medical Journal.*

CORRECTION.

In our notice of Professor Hirschberg's work on the Electro-magnet, the paragraph stating his results (p. 152) should read as follows:—"The results obtained by Hirschberg after the removal of iron from the vitreous were normal vision in two cases, partial vision ($\frac{1}{50}$) in one case, &c., &c."

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A STATISTICAL REVIEW OF 108 CASES OF GLAUCOMA.

By Surgeon-Major E. F. Drake-Brockman, F.R.C.S.,
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This paper records statistically the history of 73 persons who suffered from Glaucoma, in 35 of whom both eyes were affected, thus making a total number of 108 eyes.

I have classified the cases under the heads of acute and chronic glaucoma. Both classes also include cases in which glaucomatous symptoms appeared suddenly or insiduously upon some previously existing local disease of the eyeball itself, or upon some pre-existing bodily state, or other cause remote from the affected eyeball. I have, therefore, divided each class into 2 subdivisions, viz., into "primary" and "secondary" glaucoma. Arranging the numbers, therefore, according to this plan, we obtain the following result :—

Table I.
Acute Glaucoma.

Primary Glaucoma.	
Nervous causes	4
Injuries	4
Fever	2
Native operation	2
Atropine	1
Rheumatism	1
Unknown causes	15
Co-existing cataract	15
Total	44
Secondary Glaucoma.	
Irido-choroiditis	1
Grand total	45

Table II.
Chronic Glaucoma.

Primary Glaucoma.	
Metrorrhagia	2
Nervous	2
Alcohol	2
Unknown causes	55
Total	61
Secondary Glaucoma.	
Irido-choroiditis	2
Grand total	63

Under the subdivision "primary," I have placed all those cases in which it was difficult to discover a cause either from the patient's previous history, or from any

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evidence in the eye itself, those in whom mental distress was pronounced, those in whom vision was impaired by co-existing cataract, those who had suffered from fever, &c., as may be seen in the table above. Under the 2nd class of secondary glaucoma, I have placed all those cases in which a pre-existing cause was found in the eyeball itself, as iritis. Among the former, acute glaucoma supervened in 44 cases, and the number of days which elapsed in each case before the patient applied for relief was as follows :—

TABLE III.

PRIMARY. Days	2	3	4	5	6	7	8	10	12	14	20	25	4 weeks.	6 weeks	Unkwn. time.	Total.
Unknown cause	1	0	1	0	1	1	1	2	0	1	3	0	0	0	4	15
Cataract	0	5	1	2	0	0	0	4	1	0	0	0	0	0	2	15
Nervous causes	0	0	0	0	0	1	0	0	0	1	0	0	0	0	2	4
Injuries	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	4
Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Native operation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Atropine	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Rheumatism	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
SECONDARY.																
Irido-choroiditis	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Total	1	5	2	2	2	2	1	6	1	4	4	1	2	2	10	45

The unfavourable results obtained from treatment were no doubt due, in a great part, to the delay in resorting to medical advice. The shortest interval was 2 days in one case, the cause for which was not manifest, and the longest known period which was permitted to pass was 6 weeks in a case of fever. The largest number of patients, viz. 10, presented themselves after the acute symptoms had existed for an uncertain time ; 6 applied for relief after 10 days ; 5 after 3 days ; 4 applied 20 and 14 days respectively after the onset of the attack ; 2 sought relief after 4, 5, 6, 7 days and 4 and

6 weeks respectively had passed away, and the remainder was made up as follows:—1 after 2 days; 1 after 8 days; 1 after 12 days; and 1 after 25 days.

By rearranging the above figures, an imperfect estimate may be formed of the success which is likely to follow treatment after the lapse of various intervals of time. The numbers are, however, too small to permit of any reliable deduction being drawn.

TABLE IV.

		Removal of pain.	Vision restored.	No improvement	Total	Percent. of recoveries
2 days after...	Unknown cause ...	1	0	1	1	none
3 ,,	Cataract present...	5	3	2	5	60 %
4 ,,	Unknown cause ...	1	1	0	2	100 %
	Cataract ...	1	1	0		
5 ,,	Cataract present...	2	2	0	2	100 %
6 ,,	Unknown cause ...	1	0	1	2	50 %
	Atropine ...	1	1	0		
7 ,,	Unknown cause ...	1	0	1	2	50 %
	Nervous causes ...	1	1	0		
8 ,,	Unknown cause ...	1	0	1	1	none
10 ,,	Unknown cause ...	2	0	2	6	50 %
	Cataract present ...	4	3	1		
12 ,,	Cataract present ...	1	0	1	1	none
14 ,,	Unknown cause ...	1	1	0	4	75 %
	Nervous causes ...	1	0	1		
	Injury ...	1	1	0		
	Irido-choroiditis ...	1	1	0		
20 ,,	Unknown cause ...	3	0	3	4	none
	Injury ...	1	0	1		
25 ,,	Injury ...	1	1	0	1	100 %
4 weeks after	Injury ...	1	0	1	2	50 %
	Rheumatism ...	1	1	0		
6 ,,	Fever ...	2	2	0	2	100 %
Unknown time	Unknown cause ...	4	2	2	10	50 %
	Cataract present...	2	1	1		
	Nervous causes ...	2	0	2		
	Native operation...	2	2	0		
		45	24	21	45	53·33 %

Classes of persons suffering from acute glaucoma. These were Eurasians, Mahommedans, and Hindoos in the following proportions :—

	Persons.	Eyes.
Eurasians	5	6
Mahommedans	6	9
Hindoos	26	30
	37	45

As the majority of patients who attend the hospitals in Madras are necessarily Hindoos it is but natural to expect that this race will furnish the greater number of instances of glaucoma. The number is too scanty, perhaps, from which to calculate any percentages as to the greater liability of Hindoos to glaucomatous changes in the eye as compared to the other races of India. The percentage of Europeans afflicted with glaucoma, I think, may fairly be said to be equal to that noticed in the hospitals of Great Britain ; according to Mr. Priestley Smith, as recorded in his work on glaucoma, it is said to bear the proportion of 1 per cent. of all diseases of the eye in the 5 chief Ophthalmic hospitals in England.

Taking all classes together, however, I have estimated that at the Eye Infirmary, Madras, in the course of 5 years, the percentage is about 4·75, or in the equivalent proportion of 1 in 21. There can be little doubt that there is a very great difference in the relative frequency of the disease in the Madras Presidency, or in the city of Madras, as compared with the hospitals in England, or on the continent of Europe, especially in reference to the chronic form of the disease.

Sex.—Of the 37 persons suffering from the acute form, 15 were males and 22 were females. By arranging these numbers, and the causes which occasioned the disease, as far as they could be ascertained, we may, perhaps, be able to judge of the reason for the preponderance on the side of the females.

TABLE V.

			Males.	Females.
Unknown cause	...	...	3	12
Cataract present	...	...	10	5
Injuries	...	...	3	1
Nervous causes	...	...	1	3
Native operation	...	...	2	0
Fever	...	...	2	0
Atropine instillation	...	...	0	1
Rheumatism	...	...	0	1
Irido-choroiditis	...	...	0	1
Total	...	...	21	24

It will be noticed, therefore, that among males, those who were suffering from cataract were the most liable to glaucomatous attacks; these amounted to 10 out of a total of 21, or in the proportion of nearly 50 per cent. Next in frequency were those who had sustained injuries, in the proportion of 14·3 per cent. In 5 of the former the cataracts were of the Morgagnian variety, and in reference to this, I have noticed that the danger of leaving a mature cataract until it becomes Morgagnian is increased by the sudden setting in of glaucomatous symptoms; the pressure on the surrounding structures is augmented as soon as pathological changes take place, which tend to increase the bulk of the lenticular substance. In the cases of traumatic cataract, of which there were 2, we can readily account for the production of unfavourable symptoms, occasioned by the swelling of the lens structure after injury. The injuries which produced the disease were chiefly blows from sticks and such like agents during work time.

Among the females, the greatest number, viz., 12 cases, have been placed under unknown causes, occurring in females of and above 40 years of age. The ages of these 12 were respectively as follows:—

TABLE VI.

40 years of age	4
45 ,,	2
50 ,,	3
52 ,,	1
56 ,,	2
	12

Occurring in these cases among females at and after 40 years of age, some deep-seated uterine affection or catamenial irregularity may be suspected, in some measure, to have exerted an influence in the production of the disease. I have seen cases in the East in which the menstrual function was continued up to the age of 60 years, most frequently in a metrorrhagic form, accompanied by considerable constitutional disturbance.

Mental distress is stated to have been active in producing the abnormal symptoms in 3 females. Poverty and the anxiety associated therewith, with other domestic annoyances, were the chief agents.

Atropine instillation is named as a cause in 1 case. This patient applied at the out-patients' department on account of a cataract of the right eye. A four-grain solution of atropine was instilled prior to the extraction of a cataract. Within 24 hours glaucoma set in; she was admitted and at once an iridectomy was performed. This was followed by the rapid removal of all pain in the eye and head, and the tension was reduced to normal. The patient was 60 years of age, an incipient cataract was present in the left eye, which, in all other respects, was normal.

The eyes affected were as follows:—

TABLE VII.

	Right eye.	Left eye.	Total.
Males ...	10	8	18
Females ...	16	11	27
Total ...	26	19	45

The preponderance in both sexes was in the right eye

The following tables exhibit the degrees of vision before and after an operation, or medical treatment :—

TABLE VIII.

	Before treat.	After treat.
Count fingers … … … …	3	3
Perception of light … …	28	14
Vision $\frac{1}{36}$ … … … …	1	0
Vision $\frac{6}{36}$. … … …	1	0
Vision $\frac{6}{24}$ … … … …	1	1
Vision $\frac{6}{18}$ … … … .	3	0
Shadows … … … …	6	3
Vision $\frac{6}{12}$ … … .. …	1	0
No vision … … … …	1	1
Vision $\frac{1}{6}$ … … … …	0	2
Vision $\frac{6}{6}$ … … … …	0	4
Vision $\frac{6}{9}$ … … … …	0	3
Vision $\frac{6}{12}$ … … … …	0	4
Vision $\frac{6}{18}$ … … … …	0	6
Vision $\frac{6}{24}$ … … … …	0	3
Panophthalmitis… … … …	0	1
Total …	45	45

Treatment. — The treatment was varied. The greatest benefit, I think, was derived from the use of eserine followed by an iridectomy, and in those cases in which there was a cataract ready for removal, or in which the lens was exerting undue pressure on the surrounding parts, a subsequent extraction of the lens was performed. The following table speaks for itself :—

TABLE IX.

	Unknown cause.	Cat. present.	Injuries.	Nervous.	Nat. oper.	Fever.	Atropine.	Rheumatism.	Irido-Choroid.	Total.
Eserine and Iridec. …	12	4	3	2	1	1	0	1	0	24
Eser., Iridec., and Ext. of Lens … … …	2	11	1	1	1	0	0	0	1	17
Eser. and Sclerotomy..	1	0	0	1	0	1	0	0	0	3
Eserine alone …	0	0	0	0	0	0	1	0	0	1
Total …	15	15	4	4	2	2	1	1	1	45

In seventeen cases an opaque lens was removed.

No fair deduction can be drawn from the above table in reference to the relative benefit derivable from each method of treatment, and therefore a re-arrangement of the figures above given becomes necessary, so as to exhibit the corresponding results obtained from each method of procedure. These have been tabulated as below :—

TABLE X.

	No improvement.	$V=\frac{6}{6}$	$V=\frac{6}{9}$	$V=\frac{6}{12}$	$V-\frac{6}{18}$	$V=\frac{6}{24}$	$V=\frac{6}{36}$	Total.
Eser. and Irid.	14	1	2	3	2	1	1	24
Eser., Irid., and Cat. removal[*]	[*]6	3	1	0	3	2	2	17
Eser. and Sclerotomy ...	3	0	0	0	0	0	0	3
Eserine alone...	1	0	0	0	0	0	0	1
Total ...	24	4	3	3	5	3	3	45

Comparing, therefore, once again this table with table viii., and noticing only those cases in which the vision could be estimated beforehand and after treatment, and in which the degree of vision was sufficient for the requirements of every-day life, at the same time omitting notice of all doubtful cases, we obtain the following results :—

TABLE XI.

BEFORE TREATMENT.		AFTER TREATMENT.	
Counts fingers	3	Useful vision	2
Vision $\frac{1}{36}$	1	Vision $\frac{1}{6}$	3
Vision $\frac{6}{36}$	1	Vision $\frac{6}{6}$	4
Vision $\frac{6}{24}$	1	Vision $\frac{6}{9}$	3
Vision $\frac{6}{18}$	3	Vision $\frac{6}{18}$	5
Vision $\frac{6}{12}$	1	Vision $\frac{6}{12}$	3
Vision —	0	Vision $\frac{6}{24}$	3
Total ...	10	Total ...	23

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[*] Suppuration of the eyeball occurred in one of these cases, and in one case enucleation was resorted to.

It is evident, therefore, that in acute glaucoma, whether primary or secondary, very great benefit was obtained from treatment by the various plans which have been enumerated. Again, of the different plans of treatment, the method by instillation of eserine in conjunction with the subsequent performance of an iridectomy, and removal of the opaque lens where it was necessary, appears to have furnished the best results, for of the 17 cases in which this plan was adopted, 12 recovered their sight to a greater or less degree. In the 24 cases in which eserine was used and an iridectomy performed, the restoration of sight took place in 9 instances. It should be borne in mind, however, that in the former of these cases also eserine was used, and a preceding iridectomy had been performed; so that it is right to assign some part of the success in those cases to the use of the myotic and to the excision of a segment of the iris.

The case in which eserine alone was employed with a good result has been already referred to, in which a few drops of an atropine solution had been used in the examination of a cataract.

As regards the value of the operation of sclerotomy, I cannot speak with confidence. In this record it will be observed that the occasions on which I performed it have been few; the reason being, that prior to the period from which I have collected the cases which form the subject of this paper, I adopted it 12 times, and the results in restoring vision were noted in but 2 only. In one, the subject being a native who had undergone the operation of couching at the hands of a native doctor, and in whom all vision had been lost, the perception of light and shade was again restored. In the other, which was a case of primary glaucoma supervening upon the primary affection of the other eye (?), the vision was greatly benefited. The case is an interesting one, as furnishing a contrast between the results after the operations of iridectomy and sclerotomy in the same subject. My notes are as follows :—

Moideen Shah, aged 45 years, a Mahommedan labourer, was admitted on the 8th January, 1879, with the following statement :—Suffered first in the right eye 6 months ago ; the organ becoming inflamed and throbbing with pain, the pain extending all over the right half of the head, accompanied with vomiting of bilious matter. Since that time he has had repeated attacks of pain, but of a less severe character, but with gradually increasing deterioration of vision in the left eye. Several tortuous and congested subconjunctival vessels were noticed ; pupils contracted, fixed ; lens hazy, merely appreciates light ; T + 2 in both eyes.

16th January.—Under chloroform the right eye was sclerotomised above, and the left eye was iridectomised upwards.

24th January.—Considerable improvement effected in both eyes by the operations ; is able to count fingers readily, and to distinguish such objects as a pen or a lens held before him ; T of the right eye is much reduced, that of the left eye remains unaffected.

29th January.—With the left eye vision $\frac{2}{6}$; with the right eye vision is $\frac{3}{6}$; with both eyes vision $\frac{4}{6}$; with the right eye reads Jager 1 at 3 inches, and with left eye reads the same type at 2 inches.

I have not given sclerotomy as fair a chance as iridectomy. As a rule, the less promising cases were chosen for the exhibition of this operation, cases in which I thought the chance of doing mischief was less. And it will be noticed that, acting on this principle, I have employed the operation oftener in cases of chronic glaucoma. I have noticed however, that the immediate effect of the operation is to reduce, in a very marked manner, the tension of the eyeball, bringing it down to the normal, or even below it, and at the same time removing all existing pain.

Chronic Glaucoma.

The number of persons who came under observation for chronic glaucoma during the same period was 36, in 27 of whom both eyes were affected; the total number of eyes being 63.

The classes from which these illustrations of the disease were obtained were Europeans, Eurasians, Mahommedans, and Hindoos in the following proportions:—

Table I.

	No. of Persons.	No. of Eyes.
Europeans	2	2
Eurasians	2	3
Mahommedans	4	7
Hindoos	28	51
Total ...	36	63

There is nothing in this table which calls for remark; the majority of subjects were furnished by the Hindoo races, and the remarks which have been made before under the head of acute glaucoma on this point apply here also.

For the sake of comparison, the same order of tabulation will be adopted in these cases as in those of acute glaucoma, under the subdivisions "primary" and "secondary," thus:—

Table II.

	No. of Persons.	No. of Eyes.
Primary.		
Unknown causes	31	55
Metrorrhagia	1	2
Nervous causes	1	2
Alcohol	1	2
Secondary.		
Irido-choroiditis	2	2
Total ...	36	63

The relative periods of time during which the disease existed before application was made for medical or surgical relief was as follows :—

TABLE III.

PRIMARY GLAUCOMA.	3 months.	4 months.	6 months.	7 months.	1 year.	2 years.	3 years.	4 years.	5 years.	10 years.	Unknown time.	Total
Unknown causes	7	2	12	1	12	6	4	1	2	1	7	55
Metrorrhagia	,,	,,	,,	,,	,,	2	,,	,,	,,	,,	,,	2
Nervous causes	,,	,,	,,	,,	,,	2	,,	,,	,,	,,	,,	2
Alcohol	,,	,,	,,	,,	,,	,,	,,	,,	,,	,,	2	2
SECONDARY GLAUCOMA.												
Irido-choroiditis	,,	,,	,,	,,	,,	,,	1	1	,,	,,	,,	2
Total ...	7	2	12	1	12	10	5	2	2	1	9	63

The periods of time varied from 3 months to 10 years (?). No reliance can be placed, however, upon these figures, I think. The case which was said to have been 10 years in existence was one in which a black cataract was present, after the removal of which no vision was restored. The greatest number, viz., 12, is returned under the periods respectively of 6 months and 1 year ; in 9 cases the vision is said to have pre-existed for an unknown period ; 7 after 3 months ; 5 cases had extended over a period of 3 years ; and 2 cases over a period of 4 months, 4 years, and 5 years respectively. In 1 case the disease had existed for 7 months, and in another for 10 years.

By a re-arrangement, similar to Table IV. in the first part of this paper, of the cases of chronic glaucoma we obtain the following as the results of treatment :—

TABLE IV.

	Vision restored.	No improvement.	Total.	Per cent of recoveries.
3 months after...Unknown cause...	4	3	7	57·14 %
4 ,, ,, ... ,, ,, ...	1	1	2	50·0 %
6 ,, ,, ... ,, ,, ...	4	8	12	33·33 %
7 ,, ,, ... ,, ,, ...	1	,,	1	100 %
1 year after ... ,, ,, ...	5	7	12	41·66 %
2 years after ...Unknown cause...	,,	6	10	none.
...Metrorrhagia ...	,,	2		
...Nervous cause ...	,,	2		
3 years after ...Unknown cause...	3	1	5	60 %
.. Irido-choroiditis...	,,	1		
4 years after ...Unknown cause...	,,	1	2	none.
..Irido-choroiditis...	,,	1		
5 ,, ,, ...Unknown cause...	1	1	2	50 %
10 ,, ,, ... ,, ,, ...	,,	1	1	none.
Unknown time... ,, ,, ...	1	6	9	22·22 %
...Alcohol ...	1	1		
Total	21	42	63	33·33 %

This table brings out a curious result. It may be noticed that the greatest percentage of recoveries, viz., 100, took place in those cases in which the lapse of time between the advent of symptoms and the adoption of remedial measures was stated to have been 7 months; next to this comes the interval of 3 years, after which time the rate is 60 per cent.; next to this comes the interval of 3 months, and this is followed by the periods of 4 months and 5 years; and, finally, the periods of 6 months and an "unknown" time. No vision was restored in those cases which came under observation after an interval of 2 years, 4 years, and 10 years. On striking the percentage of the total (63), we find that about one-third recovered with improvement in vision to a greater or less degree after treatment.

Sex and Age.—Of the 36 persons who form the subject of this portion of this paper, 15 were females and 21 males. Classifying these as we have already done in Table V. of the first part, we obtain the following results:—

TABLE V.

	Males.	Females.
PRIMARY.		
Unknown cause	31	24
Metrorrhagia	0	2
Nervous causes...	2	0
Alcohol	2	0
SECONDARY.		
Irido-choroiditis	2	0
Total ...	37	26

TABLE VI.

Classifying these again under their respective ages we find that—

At the age of	30	there were males	0	and females	1
,,	35	,,	1	,,	0
,,	36	,,	1	,,	0
,,	40	,,	1	,,	2
,,	45	,,	2	,,	2
,,	46	,,	2	,,	1
,,	47	,,	1	,,	0
,,	48	,,	1	,,	0
,,	49	,,	0	,,	1
,,	50	,,	5	,,	3
,,	52	,,	0	,,	1
,,	55	,,	0	,,	4
,,	60	,,	6	,,	0
,,	66	,,	1	,,	0
			21		15

With the exception of 3 persons, all the cases of chronic glaucoma occurred in patients from and above 40 years of age. The 3 former included 2 males and 1 female.

In one of the male patients nervous disease appears to have been the cause of the glaucomatous changes in the eye. The history of the case merely states that "mental disturbance seems to have been the exciting cause." The second case among the males was an European who was troop-sergeant-major in a cavalry regiment. He had suffered from syphilis many years previously, and 8 years back he had suffered from rheumatism. From the history of the case it appears to be pretty certain that he suffered from a syphilitic irido-choroiditis, which, in time, led to chronic glaucomatous changes. Two iridectomies were performed, an interval of 8 days having passed between the two operations ; the first iridectomy failed in removing the pain from which he suffered. After the second operation all pain and inconvenience in the eye ceased, and he was discharged to his military duties. Two years after he was again admitted in order to have the eyeball removed on account of the buphthalmic condition into which it had passed.

In the case of the female no satisfactory history could be obtained as to the onset and progress of the disease, nor was there anything in her appearance or occupation which could furnish a clue to the cause of the glaucomatous attack.

Looking at Table V. it stands out very prominently that all the females suffered from "primary" glaucoma of a chronic nature, or, in other words, from glaucoma which could be traced to no evident cause other than a peculiarity of constitutional state, and in one case to decided uterine disorder ; and as the ages of all these ranged between 40 and 50 years, except in the case already referred to, it is presumable that irregularity in the uterine functions also had a considerable share in the production of the disease.

In 3 cases among the males a previous native operation of depression or reclination induced the onset of the disease. This is a very frequent cause of the disease among the natives of India ; the injury done to the structures of the eyeball by a native operator is in some instances very great, and the suffering to the deluded patient is in proportion. The free removal of a portion of the iris affords great relief. Every attempt to remove the displaced lens from the vitreous chamber failed, and as in one or two instances severe choroidal hæmorrhage followed such attempt, I have never aimed at more than to relieve the pain by performing an iridectomy.

The relative frequency with which the eyes were affected appears from the table below :—

TABLE VII.

	R.E.	L.E.	Total.
Males	18	19	37
Females	12	14	26
Total	30	33	63

The affection was nearly equally distributed between both eyes. This is more frequently the case in the chronic than in the acute form of the disease ; and this is to be expected, when it is remembered that, as a rule, persons suffering from chronic glaucoma are usually attacked in both eyes simultaneously or at very brief intervals of time between the two eyes. As has been already mentioned in the first paragraph of this paper, no less than 27 patients out of the total number of 36 suffered from the disease in both eyes.

The results may be seen from the table below, by comparing the condition of sight before and after operative procedure or medical treatment :—

TABLE VIII.

BEFORE TREATMENT.		AFTER TREATMENT.	
No vision	14	No improvement	41
Perception of light	29	Useful vision	8
Shadows	11	V $\frac{6}{9}$	1
Counts fingers	3	V $\frac{6}{12}$	6
V $\frac{3}{64}$	1	V $\frac{6}{36}$	3
V $\frac{6}{60}$	1	V $\frac{2}{36}$	1
V $\frac{6}{36}$	3	V $\frac{6}{18}$	3
V $\frac{1}{36}$	1		
Total	63	Total	63

Treatment.—The treatment adopted in these cases was as varied as in the cases of acute glaucoma, and the results which were obtained under the various methods are as follows:—

TABLE IX.

	Unknown Cause.	Metrorrhagia.	Nervous.	Alcohol.	Irido-choroiditis.	Total.
Eserine and irid ...	*37	0	2	1	1	41
Eserine and sclerot.	6	1	0	1	0	8
Eserine, irid, and remov. of lens ...	11	1	0	0	0	12
Iridec. alone ...	1	0	0	0	0	1
Enucleation ...	0	0	0	0	1	1
Total ...	55	2	2	2	2	63

In 12 of these cases the co-existing cataract was removed some time after the operation of iridectomy.

Placing these results under the various plans of treatment used, the following table is constructed, which is instructive:—

TABLE X.

	Eser. and Irid.	Eser. and Sclerot.	Eser. Irid. and remov. lens.	Iridect. alone.	Enucleation.	Total.
No improvement ...	†28	4	7	1	1	41
Useful vision ...	7	1	0	0	0	8
V $\frac{6}{9}$	0	0	2	0	0	2
V $\frac{6}{12}$	3	0	3	0	0	6
V $\frac{6}{18}$	1	2	0	0	0	3
V $\frac{6}{36}$	2	0	0	0	0	2
V $\frac{2}{36}$	0	1	0	0	0	1
Total ...	41	8	12	1	1	63

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* One of these cases underwent enucleation.

† In one of these cases enucleation was practised.

By comparing, therefore, this last table and table 8 of those cases in which the degree of vision could be estimated, and excluding from our notice all those in which there was any doubt, we obtain the following results :—

TABLE XI.

BEFORE TREATMENT.		AFTER TREATMENT.	
Counts fingers at 4ft....	3	Useful vision ...	8
V $\frac{3}{24}$	1	V $\frac{6}{9}$...	1
V $\frac{6}{60}$	1	V $\frac{6}{12}$	6
V $\frac{6}{36}$	3	V $\frac{6}{36}$	3
V $\frac{1}{36}$	1	V $\frac{2}{36}$	1
		V $\frac{6}{18}$	3
Total ...	9	Total ...	22

As we have already seen, great benefits may be conferred, as in the case of acute glaucoma, even in what might be regarded as most unfavourable cases for interference. It may be noticed also in Table X. that the greatest benefit was derived from the instillation of eserine with a removal of a segment of the iris. Of the 41 who were so treated, 13 recovered with vision, or in the ratio of 31·70 per cent. In 11 instances the lens was subsequently removed for cataractous opacity, but the results were not so favourable as one would be led to expect, the percentage being 36·33. Of those in which the combined use of eserine with sclerotomy was employed, 4 out of 9 recovered, or at the rate of nearly 50 per cent. If any conclusion can be drawn from so small a number of cases, it is that, in cases of chronic glaucoma, eserine with sclerotomy may be expected to give the most favourable results. I hesitate, however, to draw any conclusion to this effect from the small numbers before me.

Ernst Fuchs (Liege). The Causes and Prevention of Blindness. *Wiesbaden. J. F. Bergmann*, 1885.

(Continued from page 168.)

Section VIII. *Influence of Climate and Race.*—In hot countries blindness is, as a rule, more common than in cold; it diminishes accordingly in frequency from the south towards the north, but the rule is by no means universally applicable, for in Norway and Finland blindness is exceptionally common. Again it is, as a rule, commoner on the coasts than in inland and especially in mountainous countries; Switzerland shows a remarkably low percentage, but Norway on the other hand, which is no less mountainous, shows a high one. The following list shows the number of blind to each ten thousand inhabitants in various European countries:—

Spain	11·09	Finland	22·45
Italy	10·15	Belgium (Coast)	9·67
France	8·36	Belgium (Southern Mountainous Provinces)	5·0—5·16
Germany	8·79		
Sweden	8·05	Switzerland	7·61
Norway	13·63		

Certain diseases, *e.g.*, conjunctivitis and hemeralopia, show a preference for certain times of the year, but among those which lead to blindness the only well-established association of this kind is the especial frequency of corneal abscess in the summer.

The greater prevalence of blindness among certain races depends, for the most part, upon lesser degrees of civilisation and unhealthy habits of life rather than upon racial liabilities of any special kind. The only well-established instance of the latter is the especial frequency of glaucoma amongst the Jews. In Arlt's clinique at Vienna it was found that Jews constituted 11·5 per cent. of all the patients treated, while they supplied 23 per cent. of the glaucoma cases. Again, among 20,000 patients treated by Wagner in Odessa about one half were Jews, the other half Christians; the former supplied 255 cases of glaucoma, the latter 155 cases. The assertion of Swan Burnett and Knapp that negroes have an especial immunity from trachoma appears to want further confirmation, for the negroes of the west coast of Africa are said to suffer severely from the disease.

SECTION IX. *Treatment of Eye Diseases.*—In order to successfully combat the causes of blindness, provision must be made that every person affected with disease of the eye shall have the opportunity of obtaining efficient treatment, and the public must be educated to understand the importance of obtaining such treatment at the right time. Such education alone can obviate the disasters which attend neglect and quackery. Legislation against quackery has been attempted in many countries, but with little result. In Germany laws of this nature are no longer in force, but penalties are imposed upon those who injure others by improper treatment. The best preventive of quackery is the education of the people.

The teaching of Hygiene has hitherto been too much neglected. It is not yet taught even in all universities, and for the spread of such knowledge among the masses of the people very little has been done. In England certain voluntary societies are now working well in this direction. In North America popular information with regard to laws of health is published in some of the cheap almanacks. In France only is there at present any systematic and general teaching of Hygiene.

As a part of such instruction it would be most useful to teach people generally something of the nature and dangers of some of the commoner diseases of the eye, *e.g.*, the ophthalmia of new-born infants, trachoma, school-myopia, and injuries, and this may best be done, probably, by means of cheap lectures and publications Useful work of this kind has already been done by the English Society for the Prevention of Blindness and by other agencies.

The other requirement relates to the supply of medical practitioners and to their knowledge of the diseases in question. It is undoubtedly the duty of the State to make provision that no district, however poor and thinly populated, shall be without medical aid adequate to its requirements. In Norway and Sweden medical men are in such cases established and remunerated by the State, to the great advantage of the people.

Every practitioner of medicine should be competent to diagnose and to treat the slighter disorders of the eye. The ability to diagnose the deeper seated diseases, to estimate errors of refraction, and to perform operations, cannot reason-ably be expected. The attention bestowed on the teaching of Ophthalmology varies greatly at the present time, in different countries. Austria was the first to introduce it as a system, and sets at present the best example. Every university has its independent eye-clinic, with a professor at its head. Attendance on lectures and at the clinic is obligatory on students, and occupies about ten hours a week (!) during one session. An operative course is indirectly obligatory, inasmuch as a practical knowledge of operating is required at examinations. Ophthalmology is included among the regular subjects of examination for the license to practise. In most other countries the subject occupies a less important place in the curriculum of the medical student, especially in France and in England. In fourteen out of the twenty-two medical schools of France no provision is made for the study of diseases of the eye. The University of Paris appointed its first Professor of Ophthalmology in the year 1879. In England, not only are the arrangements for systematic instruction of this subject defective, but the authorities are divided in opinion as to the need for such instruction. The Universities of London and Edinburgh have declared themselves opposed to demanding a knowledge of Ophthalmology from their candidates.

The aim of the instruction in question should be to give every student practical experience in examining and diagnosing cases of eye disease ; in learning certain manipulations, such as everting and cauterising the lids, removing foreign bodies, sounding the tear-passages, &c. ; in recognising especially the ordinary inflammatory conditions, both of superficial and deeper structures, so that he shall not in after practice make the mistakes, now far too common, of treating an iritis with nitrate of silver, or a glaucoma with atropine, and in dealing efficiently with cases of injury. An operative course upon the dead subject is desirable, not so much that he may be able subsequently to perform such operations on the living, but to increase his manual dexterity in the smaller manipulations above referred to. He should learn the use of the ophthalmoscope sufficiently for the purposes of the simpler diagnoses. Refraction need be learned only in its general principles ; most students find it difficult beyond all other branches of the subject, and few among them, even with considerable trouble, learn it to practical advantage. Examinations conferring the right to practise should include an examination in practical knowledge of diseases of the eye.

In addition to a better training of general practitioners, a better provision of specialists is wanted. By them only can the more difficult diagnoses be made, errors of refraction properly dealt with, and the major operations safely performed. The nature of most eye disorders being such that the patient can usually travel to visit the doctor, the help of a specialist should be nowhere out of reach. In Germany there is an ample number of oculists, but while they are in excessive numbers in certain of the cities, there are large districts where none are to be found. In many other countries the supply is decidedly deficient.

It should be recognised as the duty of the State, or of the province or town respectively, to provide for the establishment of an oculist where the deficiency exists. If it appears that no one will voluntarily attempt to establish an ophthalmic practice in the district in question, it may be necessary to offer more or less official help and support according to the number and wealth of the inhabitants and so forth. In such a case the responsibilities might fairly be divided as follows:—The surgeon, being established under official authority, should have the right to designate his clinic by the authorised terms of State or District Eye-Clinic (Staats, Kreis, Augenklinik), a proof to the public that he is a person for whose competency the authorities are to a certain extent responsible. Due notice of the establishment of such clinic should be officially given to the public in the newspapers of the district, whereby the surgeon would lay himself open to no charge of personal advertising, while at the same time the success of his undertaking would be furthered. In case of need, pecuniary help should be given for the establishment of the clinic—for furniture, instruments, attendants, and so forth; also, in some cases, for the gratuitous giving of medicine and spectacles to the poor. For cases requiring in-door treatment, a certain number of the beds of the general hospital of the district should be set apart for the use of the ophthalmic surgeon; or, where this is impossible, a sufficient number of beds in a suitable house should be provided.

In return for such official support the surgeon should naturally be able to give evidence of special competency and of previous training as an assistant at an eye-hospital. He should see patients at an appointed hour at least every alternate day, the poor gratuitously. He should annually present a report to the authorities detailing the work done, and calling attention to any matters of importance connected with eye disease in his district. He should undertake the examination of the eyes of the children in the public schools of his district. His public work should remain under the control of the authorities, in order that it may at all times be systematically carried on for the public good and not be turned to mere personal advantage.

If the preventive measures indicated by sanitary science are to attain their object, they must be systematically put in practice, and this can only be ensured by placing in the hands of a central sanitary authority the control of all such matters throughout the whole country. The duty of such central authority should be a double one. Firstly, the organisation and direction of the entire sanitary service; secondly, the working out of statistical and scientific results from the various reports received. The following are the special duties which it should undertake in connection with the hygiene of eyesight:—To lay down regulations connected with education, *e.g.*, construction of schools, school furniture, school books, methods of instruction, amount of tasks imposed, &c.; to create commissions for the inspection and control of schools; to establish and direct medical inspectors of schools; to establish ophthalmic clinics where the need for such exists, and to arrange a uniform system for reports of the work done in these establishments; to work out from such reports the scientific results which they alone can supply; to investigate certain questions of general importance, such as modes of infection, comparative values of antiseptic substances, and so forth.

Public sanitation is very differently managed in different countries. In some the State pays no heed to the matter, leaving it entirely to the individual communities. This is at present the case in Belgium and in Norway. It has the disadvantage that sanitary matters are neglected where the local authority is incompetent or careless. In others the sanitary service is directed by a Minister of State, under whom is a council of competent professional advisers. The resolutions and advice of the latter. however, not being in any way binding upon the Minister, are too often disregarded and become a dead letter. The most rational system is that which is in force in England. Here the Local Government Board holds authority over all branches of public sanitary service. It receives reports and statistics ; it lays down regulations, and directs their carrying out ; it prescribes the constitution of subordinate sanitary authorities and controls them.

The supreme authority in sanitary matters should lie with a body of men possessed of the necessary scientific knowledge, and invested with power to put their decisions in force ; and in order that the hygiene of the eye may receive due attention, an ophthalmic specialist should have a voice in these decisions.

There are in Europe at the present time certainly more than 300,000 blind persons, and of these, according to the lowest computation, at least one third might have been saved from blindness by properly directed measures of prevention and treatment. The amount of human suffering and distress which it is thus in our power to prevent in this one direction is enormous. The loss to the community at large involved in the maintenance of its blind members may safely be stated at not less than twenty-seven million francs a year (more than one million pounds sterling), a sum which would more than suffice to meet the cost of the most complete precautionary measures for the prevention of blindness.

We have made lengthy abstracts from Professor Fuchs's book because it appears to us to be a work of exceptional practical value. It connects in a manner hardly to be met with elsewhere the most important results of ophthalmic science with wide questions of philanthropy and social economy. We hope and believe that it will be productive of wide-spread good, and thus fulfil the aims of its author and of the Society who were the means of calling it into existence.

W. F. NORRIS (Philadelphia). Hereditary Atrophy of the Optic Nerves. *Transactions American Ophth. Soc.*, 1884, *p.*

The author gives a most interesting account of an unfortunate family of seven children all suffering from this remarkable affection, the eyes of the parents being perfectly healthy, while evidence was forthcoming of a similar form of blindness having existed in several other members of the family, all on the mother's side. The children became affected between the ages of 7 and 19, the blindness being marked by definite central scotomata in all whose fields admitted of accurate charts being taken, and being probably best marked in the centres of the fields of the others whose want of sight or want of intelligence prevented effective perimetry. More or less frontal headache accompanied the onset of the blindness in all the cases, and all exhibited well-marked signs of optic neuritis, in a filled up or waxy appearance in the discs, distinct lymph reflexes along the vessels, striation of the circumpapillary retina, and contraction of the retinal arteries. The onset was gradual in all the children except one.

Norris divides the actual changes in the nerve tissue into three stages. I. That of cloudy and œdematous swelling, when the disc is hazy, its normal outlines indistinct, and its substance slightly swollen. II. That of lymph reflexes, when the disc has become grayer, with less haze and swelling, and the vessels are sheathed by yellowish white lines, which in some instances pass off at an angle from the vessel and ramify through the structure of the retina. III. That of gradual death of the nerve tissue, when the reflexes are less, the vessels contracted, though never to a very extreme degree, and the disc assumes an opaque greyish filled-in appearance.

Of the seven patients, two improved during treatment, though not, Norris thinks, in consequence of it. Strychnine is the remedy he considers most valuable.

The family tree is highly interesting; it starts from the great-grandmother, the first member of the family known to have been affected.

- F. affected.
  - 1. M. affected at age of 14. Died at 45.
    - 1. M., aged 45, not affected. Had two children, but nothing known about their sight.
    - 2. M. affected at 18; died at 22.
  - F. not affected.
    - 1. M. affected at 15; died at 50. No issue.
    - 2. F. affected at 35.
      - 1. M. affected at 18; died at 30
      - 2. F. affected at 14; died at 18
      - 3. F. not affected; aged 20.
      - 4. M. aged 18; not known.
    - 3. F. not affected; aged 48.
      - 1. F. affected at 14.
      - 2. M. affected at 19.
      - 3. F. affected at 18.
      - 4. M. affected at 14.
      - 5. M. affected at 8.
      - 6. F. affected at 8½.
      - 7. M. affected at 7.
    - 4. F. not affected; aged 40. No issue.
    - 5. M. affected at 19, agd. 40
      - 1. M. aged 6, not affected.
      - 2. M. aged 3, not affected.

(For other cases of this disease, and references, *vide* O.R., present vol., p. 33.)

M. Landesberg (Philadelphia). Transitory Psychical Derangement after Cataract Operations. *Central Bl., f. Prakt. Augenh., May*, 1885, *p.* 134.

Few oculists of large experience have failed to come across cases where the use of atropine after the extraction of senile cataract has produced a sudden attack of delirium and hallucinations, going on occasionally to a state of mind almost indistinguishable from acute mania.

The affection of which Landesberg treats is, however, not believed to have any connection with atropine poisoning, but to be something *sui generis*, which is known to have occurred sufficiently frequently after cataract operations to justify the assumption that some causal nexus is to be sought for between the two events.

The first case occurred in a healthy man of 65, whose right eye was operated on for senile cataract. For the first two days everything went admirably; on the morning of the third he became peevish and morose, refused his coffee, and accused his children of trying to poison him. He then rejected all the food offered to him, became restless and excited, made threatening gestures, fought against the air, and at last suddenly jumped out of bed, tore off his bandage, and rushed out of his room into a passage, where he crept into a corner, and began to whine. He was with difficulty brought back to his bed, where Landesberg found him in a profuse perspiration, his looks wild and fixed, and complaining that his enemies were striving to make him mad. He recognised his doctor, and for the rest of the day remained quiet and took his food. The condition of the pupil of the left eye was normal. That night, however, the hallucinations returned ; he had no sleep, and talked excitedly with imaginary persons, and at one time tore his bandage off, and crept under the bed to drive out a man supposed to be concealed underneath.

This condition continued till the morning of the fourth day, when he became much quieter, and after a sound sleep during the succeeding night he awoke cured. During this period plastic iritis had developed in the eye operated on, and this necessitated a subsequent iridectomy, the final result being $V = \frac{10}{50}$.

The second case occurred in a lady, aged 57, who had cataracts removed from both eyes, four days intervening between the operations. All went well till the second night after the second operation, when the patient slept badly, and complained of hearing intolerable noises, bells, drums, etc. She thought herself a burden to her family, asked frequently for food, and then would not take it ; desired her husband and children to stay by her bed, and would then drive them away. She then fell into a condition of melancholia, and could not be persuaded that she was not helplessly blind, and destined to die in the poorhouse. Five hours later she threw her medicine (chloral hydrate) in her daughter's face, tore off her bandage, and rushed to the hall door to seek shelter at a police station, and had to be forcibly brought back to bed, where she remained in a state of wild excitement, uttering violent reproaches against all her relatives.

From this state Landesberg rescued her by the subcutaneous injection of hyoscyamine, after which she fell asleep. The next day, after 9½ hours' sleep, she was much better, and on the day after that she awoke perfectly sane. No mischief whatever had occurred in the eyes.

Landesberg does not attempt to give an explanation of this remarkable affection. He rejects, and with reason, Sichel's notion that the closure of the lids by cutting the patient off from the outer world produces this curious insanity, and does not accept Schmidt Rimpler's theory, that in people of weak mind such complete absence of all objective ocular and aural sensations as occurs in the sick room after a cataract operation must of itself have a tendency to develop subjective sensations, leading on to hallucinations and mania. This explains the occurrence of the affection in cases where a predisposition exists thereto in brains already in a state of unstable equilibrium, but does not account for the outbreak of the disease in patients with healthy brains, and no observable neurotic tendency, as in the two cases reported.

E. Berger (Graz). A Case of Erythropsia. *Central Bl., f. Prakt. Augenh, May,* 1885, *p.* 140.

This case of erythropsy occurred in a student some twenty-four hours after he had received a blow from a blunt sword in the region of the left zygoma. The acuity of vision and the field of vision exhibited no abnormality, nor could the ophthalmoscope detect anything unusual. The patient belonged to a family in which nerve disease had been of frequent occurrence, and was himself in a condition of extreme nervous anxiety after receiving the injury. Berger is inclined to attribute the erythropsy to this nervous excitement, and calls attention to the influence of "fatigue of the visual apparatus" as manifested in the time at which the attack occurred. The erythropsy showed itself on each occasion in the evening, and lasted for about the same period of time as on the first day.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, June 4th, 1885.

Henry Power, F.R.C.S., Vice-President, in the Chair.

Reported by Dawson Williams, M.D.

Congenital Defects in the Vitreous Body.—Mr. Lang showed a child with congenital lesions of the vitreous body and choroid of the right eye. A band could be traced forward from the fundus until it divided into three parts; one was attached to the back of the posterior capsule, one passed upwards, the other inwards. He thought the choroidal changes were due to intra-uterine inflammation; the disc was of a very dark grey colour, and the choroiditis was extensive. There was no history of syphilis.

Mr. Power inquired the grounds for considering the lesions congenital.

Mr. Juler thought the appearances were probably due to an inflammatory condition of the vitreous body, and not to a persistent hyaloid artery.

In reply, Mr. Lang said that he called the lesions congenital because the eye had always been defective.

Black Cataract.—Mr. Power showed a specimen of black cataract. The patient was myopic. The operation was done under cocaine. The cataract came away in the capsule: the patient could count fingers immediately, and had so far made a good recovery. He commented upon the rarity of this variety of cataract in England. This was the first example he himself had met with. Mr. Myrtle, house surgeon at the Westminster Ophthalmic Hospital, told him that he had recently seen three removed in Paris, two of them in De Wecker's practice.

Dr. Swanzy had seen a good many cases in Dublin, and in von Graefe's practice. He was under the impression that the prognosis was not good.

Mr. Lang had met with two cases; both patients were myopic. The operation and its subsequent course were in both cases most satisfactory.

Mr. Juler thought the lens shown was large, and inquired whether myopia generally accompanied black cataract.

Mr. Swanzy said that not all the cases he had seen were myopic.

Mr. Nettleship had met with not a few specimens of cataracts containing pigment, but never with so black a cataract as the one shown.

Mr. Mackinlay recalled a remarkable specimen shown to the Society some years ago by Mr. McHardy.

Mr. Adams Frost suggested that a section of the cataract should be made, to ascertain whether the coloration was uniform.

Mr. Power observed that the occurrence of black cataract had been attributed to effusion of blood, and suggested that a chemical examination might settle that question.*

Congenital Deformity of Eyelid.—Mr. McHardy showed a case of congenital deformity, probably a nævoid growth, of both eyelids on the left side, and hypertrophy of the bones on the outer side of the orbit

Mr. Spencer Watson mentioned a case in which a similar but less extensive lesion was present. The growth was almost destroyed by ligature and the actual cautery.

Mr. Power had met with several cases. In one, a child, the nævus extended deep into the orbit. Treatment by the figure-of-eight ligature had been successful on the second application. In another case, now under care, the nævoid growth, which involved the inner canthus, extended deeply into the orbit. In this case, he had carefully dissected out the greater part of the growth, but it was too soon yet to speak of the result of the case.

Mr. Nettleship referred to a case he had shown to the Society, of (apparently) lymphatic nævus. The eye was pushed forward; and the growth overlapped the orbit, and rose on to the forehead. The patient, a boy, subsequently had an attack of spontaneous inflammation in the nævus, but this was not followed by any improvement.

Mr. Jessop thought the large vessels extending backward over the zygoma and into the parotid pointed to the centre of mischief being in the external jugular vein.

Mr. Waren Tay asked whether there was any nævoid change within the eyeball.

Mr. McHardy said that he had not been able to examine the fundus oculi. A remarkable fact was that, though the eye had never been used, there was fair vision($\frac{6}{24}$). He referred to a case under Mr. Brudenell Carter's care ten years ago, with great proptosis. On dissecting down to the growth, it was found to be a degenerate nævoid growth.

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* A spectroscopic examination of Mr. McHardy's specimen, made by Dr. MacMunn, showed that the colouring matter was not derived from blood pigment, but was a cuticular pigment analogous to that of hair and feathers—a fact of much interest in relation to the cuticular origin of the lens. (*Vide* O. R., Vol. I., p. 296.)

Mr. Adams Frost said that he had recently seen the case last mentioned. The skin had never regained its natural appearance, nor had the movements of the eyelid been restored.

Growths in the Cornea and Iris.—Mr. Jessop read the report of the Committee, signed by himself and Mr. Lawford, on Mr. Benson's case of growths in the cornea and iris. The nodules on the cornea were chiefly external to the posterior elastic lamina. The nodules consisted of round nucleated cells, which stained deeply. In some spots there were signs of disintegration. There was practically no caseation. No giant-cells were found, nor any bacilli. The reporters concluded that the growths were not tubercular. They could only say that the lesion appeared to be some form of granuloma.

Intra-ocular Gumma.—Mr. W. Spencer Watson read a paper on a living specimen of intra-ocular gumma, shown at the previous meeting. A child, aged 6 years, whose history pointed to inherited syphilis, who presented symptoms (snuffles and sore anus) pointing in the same direction, and whose father was suffering from phthisis, came to the South London Ophthalmic Hospital with a protrusion of the upper and outer quadrant of the sclerotic. This was punctured; though no pus escaped, a prominent swelling remained. The earlier stages resembled those of acute onyx, with hypopion; but, after the formation of the protrusion in the sclerotic, the pus in the pupillary area disappeared. Under a course of mercury the protrusion subsided, leaving a pigmented scar in its place and a shrunken eyeball. All the other symptoms also were ameliorated, and the child's general health improved. The whole case seemed to indicate an intra-ocular syphiloma. At one time sympathetic irritation of the sound eye threatened danger to it also, but the mercurial course had a good influence, and, as the damaged eye contracted, the fellow-eye lost all irritability, and the general health correspondingly improved. This form of syphilitic affection of the eye was, according to the author's experience, very uncommon.

Mr. Adams Frost quoted a case of gumma on the anterior surface of the iris.

Dr. Brailey, while curator of the Royal London Ophthalmic Hospital at Moorfields, had met with several cases of gumma within the eyeball. All, however, were small, and were, as a rule, connected with the choroid. He had also met with two cases of tuberculosis, of which one was taken for panophthalmitis, the other for glioma. He entertained no doubt that the eye occasionally shrank after glioma.

Mr. Nettleship had seen several cases of intra-ocular gumma in patients the subject of acquired syphilis. The eye was destroyed in two cases by softening of the growth. In another case, syphilis appeared to be very improbable, and the exact nature of the growth remained obscure.

Mr. Lang related the case of a man, the subject of acquired syphilis, who had a gumma of the iris, and another at the angle of the anterior chamber. Under vigorous treatment the gummata subsided, leaving a damaged eye. In another case which he had seen, under Mr. Wordsworth's care, the gumma separated the iris from the sclero-corneal junction, but subsided under treatment, and left a very good eye.

Mr. Power thought the interest of Mr. Watson's case was the early age of the patient. Gummata on the iris in adults had been very common at one time. At Chatham, cases of gumma of the iris used to be frequently seen before the enactment of the Contagious Diseases Act. Since the authorities had ceased to enforce these Acts such cases had become more frequent. The lesion developed very rapidly, and led, commonly, to destruction of the eye. In children, however, he believed intra-ocular gummata were very rare.

Mr. Spencer Watson said that the mother in this case was probably infected by the child before birth ; the symptoms appeared after her confinement. The symptoms in the child resembled those of the secondary stage of acquired syphilis.

Double Retinal Glioma.—Dr. Brailey described a case of double retinal glioma, which resulted in the shrinking of one eye, and the perforation of the anterior part of the opposite eye, by a large projecting mass of new growth. He first saw the child, who was still living, in October, 1882, when there appeared at the fundus of the left eye a yellowish-red vascular reflex. The right eye also showed a greyish reflex, with a few vessels on it. The disease was diagnosed as glioma, the condition being more advanced in the left eye, where it implicated the entire retinal thickness, and of comparatively short duration in the other, where it was apparently confined to the external retinal layers (glioma exophytum). In the diagnosis of glioma Mr. Vernon concurred. The disease progressed slowly for ten months, when the right eye was apparently the subject of an acute suppurative panophthalmitis, during the progress of which the child lay for several days in a state of stupor. Mr. Brock, of Tooting, under whose care she was, attributed this condition to meningitis. Two-and-a-half years from the time of her being first seen, the tumour perforated the left eye, and projected for about three-quarters of an inch as a rounded mass, about half an inch in diameter, from between the lids. There was at present no evidence of any further extension of the disease. Dr. Brailey thought that the points of interest in the case were its long duration, and the fact that an intra-ocular glioma could shrink and become inert. He referred to such a case recorded by Mr. Snell in the Society's "Transactions" for 1884, to which he had himself appended another; but in neither of these did the shrinking appear to be the result of a suppurative panophthalmitis. Another point of interest was the probable mode of extension of the disease from one eye to the other. He thought that this, in some cases at all events, was by the optic nerves and chiasma.

Mr. H. Power observed that glioma in both eyes was a rare affection. In one case he recalled one eye was excised. The growth, however, developed in the other, and the patient only survived a year.

Mr. McHardy related two cases in which both eyes were the seats of glioma.

Mr. Frederick Mason thought that the shrinking of an eye affected with glioma must be a very uncommon occurrence. He had only met with one case which lent any support to the view; that was a case of glioma of both eyes. Orbital growth followed the excision of the eye earliest affected. This orbital growth shrank to a considerable extent.

Mr. Adams Frost inquired whether, in such cases, any advantage was gained by excising the second eye.

Dr. Swanzy had met with one case of glioma in a child under one year, in which both eyes were affected a very short time after birth, and probably simultaneously. He agreed with Dr. Brailey that glioma frequently grew very slowly.

Mr. Power observed that it would be interesting to know whether early excision prevented recurrence with any certainty.

Mr. Nettleship had operated, four years ago, on one case in which the growth was quite confined to the eyeball. The child had since remained perfectly well. A case under the care of the late Mr. Critchett had survived over three years. In another case, observed by Mr. Brudenell Carter, the patient survived seven or more years. Other cases were on record which tended to show that, if the affected eye were removed before the optic nerve and the orbital tissues were involved, there was a good chance that the patient would subsequently remain free from disease.

Dr. Brailey believed that complete immunity was obtained in about 20 or 25 per cent. of the cases.

Mr. Lang quoted a case which appeared to show that growth might occur in the second eye, without spreading along the optic nerve.

Mr. Waren Tay said that he had on one occasion operated on a case of glioma, and the patient remained in good health after eight or nine years. He had not recorded the case, because the specimen had been lost, and he could, therefore, not give an absolute demonstration that the tumour was a glioma.

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ON A CASE OF SYMMETRICAL DEFECT IN THE LOWER HALVES OF BOTH FIELDS OF VISION WITH RIGHT HEMIPLEGIA AND HEMIANÆSTHESIA.

By James Anderson, M.D., M.R.C.P.,

Assistant Physician to the City of London Hospital for Diseases of the Chest, and Medical Registrar to the London Hospital.

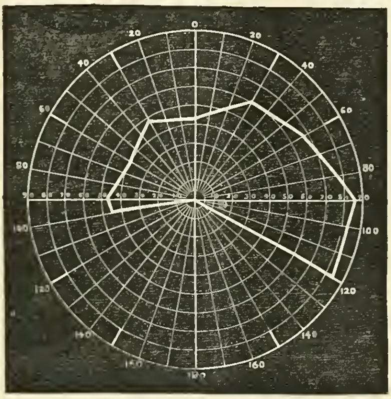
D. M., a tall, sallow, bony Scotchman, aged 28 years, was sent to me on October 31st, 1884, by Mr. Nettleship, whom he had consulted regarding his eyes. The account he gave of himself was that he had enjoyed excellent health up to 1878, when he went to Australia and settled at Port Darwin. Here he stayed till 1882, had repeated attacks of "fever," but between these attacks was in tolerably good health, always, however, constipated and requiring to take purgatives. He smoked an ounce of black stick tobacco daily, and drank a considerable amount of brandy. In November, 1882, he had a severe attack of fever, lasting six weeks, and followed by complete obstruction of the bowels. He was at this time taking quinine (about ten grains daily) and iron, for the fever. After six days without movement of his bowels, being in extreme pain, he determined to ride to the nearest medical man, who was 200 miles distant. He accomplished the distance in three days, in hot bright weather during the rainy season, eating little during his ride and drinking brandy and laudanum to dull the pain, till at last he scarcely knew what he did. At the end of his ride he had to take steamer for four hours, and on stepping ashore from the steamer, he saw something like snow falling before his eyes, and became giddy but was not actually unconscious. He was assisted to a hotel, had his bowels moved after five hours, and was prescribed some soothing draught, after which he slept for four days. On wakening he found he could not see properly, his sight before having been excellent; he could see objects in front of him well enough, he said, but he generally overshot the mark on trying to touch anything and he could not see his food. His speech was somewhat hesitating, a sort of momentary blank, he thought, but nothing marked. He soon found also that there was weakness of both right limbs, the leg being the more affected of the two, and for a time he was unable to control his movements, "like a cross and irritable child" as he expressed it. He was under the care of Professor Gosse, of Adelaide, for two months, and had a course of strychnia till his limbs jerked. His sight improved to the present point in six months. He went up country again, had fever again, came home, and had been at home for six months when I saw him.

He distinctly denied having had any venereal disease, either before or after going to Australia, and there was no evidence pointing to it. He had had an accident a year before his illness, but he did not injure his head, and he was well in three weeks.

On examination I found that the motor power of the right leg and arm was apparently perfect, although he stated that they "felt weak." Sensation over the whole of the right side of his body was very defective. Two points were felt as one on the right leg and foot when four to six inches apart, while on the left leg and foot they were distinguished as two at ½ to ¾ inch apart. Sensation to heat and cold was fairly good in both, but much keener and quicker on the left than on the right side. The right leg and arm he said always got cold more readily than the left. Taste and smell seemed unaffected, and hearing also was normal, so far as a somewhat hurried testing could ascertain. The knee jerk was well marked on the left side, exaggerated on the right, with a few vibrations of ankle clonus at first. The abdominal and epigastric reflexes could not be elicited; the cremasteric reflex was present. With the exception of a slight muffling of the first cardiac sound, the heart, lungs, and blood vessels seemed perfectly normal. The urine was healthy, 1025, acid, no albumen, no sugar.

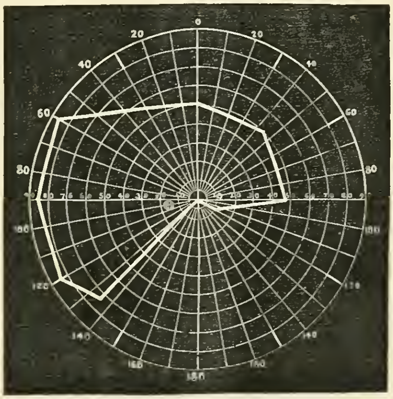
I found the ocular movements perfect; the pupils were partially dilated with atropine, and therefore could not be examined. The media were clear, and I observed no pathological appearances in the fundi. Of all objects he could see only the upper half. Mr. Nettleship has kindly furnished me with the following notes of his examination :—“$V = \frac{20}{100}$ nearly; a few words in J. 16, none in J. 14. Colour vision perfect.

Right Eye.



Fields as in the accompanying charts. Pupils rather large and sluggish. Ophth. *R*. Some pallor and deep funnel excavation, white lines along some vessels on yellow-spot side only. *L*. Same, but less marked. No other changes at all.”

Left Eye.



Dr. E. Baily, of Oban, under whose care Mr. M. placed himself on his return to Scotland, sends me the following interesting facts regarding Mr. M.'s family history:—His mother suffered from repeated epistaxis, and died at the age of 55, apparently from cerebral hæmorrhage. Two of Mrs. M.'s brothers, and two of her sisters, died suddenly at 52 and 55 years of age, the sisters having had epistaxis and hæmatemesis. Mrs. M.'s mother (patient's grandmother) died of "apoplexy" at 52; one of her uncles (patient's granduncle) had a paralytic stroke at 52; and two of her aunts died suddenly at 50 and 55. So far as Dr. Baily could ascertain, none of Mr. M.'s brothers or sisters have had cerebral hæmorrhage. As already stated, Mr. M. himself had no evidence of renal disease or of vascular degeneration.

I have not recorded this case because I have a complete and satisfactory explanation of the symptoms, but because symmetrical defect in the upper or lower halves of both fields of vision is comparatively rare, and associated with hemiparesis and hemianæsthesia is still rarer, if the association has in fact occurred. The rarity of the visual affection, and our uncertainty as to its cause or causes, renders every case important. Let us first note certain points with regard to the right hemiparesis and hemianæsthesia. The motor paralysis was partial; it affected the lower more severely than the upper limb; it had almost entirely disappeared when the patient came under observation. The hemianæsthesia was marked from the first and persisted. If the senses of hearing, taste, and smell were at all affected, the patient was unaware of it, and they were normal when he came under observation. Finally the lesion was followed by chorea or hemichorea, movements "like an irritable child," as Mr. M. phrased it. These facts point unequivocally to a lesion of the posterior segment of the left internal capsule, and chiefly of the sensory fibres occupying the posterior third of this segment. The lesion evidently affected also the neighbouring fibres lying in the middle third of the posterior or lenticulo-optic segment of the capsule which pass to the trunk and leg, and to a less extent those lying anterior to these last, and which pass to the arm. It did not extend to the extreme posterior and inner part of the segment, or we should have had the fibres of Gratiolet involved, and as a consequence hearing, taste, and smell would have been markedly affected if not destroyed on one side along with right amblyopia or right homonymous hemianopia—inability to see to the paretic and anæsthetic side—the usual group of symptoms. It may be said that these last symptoms were originally present and disappeared. This cannot be disproved, but if present they must have been the result of pressure, not of actual interruption of fibres. The lesion resulted most probably from rupture or embolism of the lenticulo-optic branch of the left middle and cerebral artery, which distributes posterior to the lenticulo-striate branch, the artery usually ruptured in cerebral hæmorrhage. Dr. Hughlings Jackson long ago pointed out that in cases of hemiplegia where the leg is most affected, hemianæsthesia is also generally present, and the recent experiments of Schäfer and Horsley (Brain, April, 1885) give a full confirmation and explanation of his clinical observations.

Regarding the cause of the visual defect we cannot speak with anything of the above certainty, and that chiefly because of our uncertainty regarding the course of the optic fibres. So far, however, as we know that course it does not seem that any single lesion will explain both the general dextral defect and the special ocular defect. Lesions affecting the pulvinar and the optic radiations of Gratiolet will produce homonymous hemianopia, but not, so far as I am aware, the defect shown in the charts. I do not see that even the acceptance of Charcot's theoretical supplementary crossing in the anterior quadrigeminal bodies would get over the difficulty, and there are good grounds for doubting if this decussation is a fact. Symmetrical lesion of the optic nerves or a lesion of the upper and anterior surface of the chiasma would explain the defect, but in the absence of proof it is useless to theorise as to the vessels affected or as to hæmorrhage or embolism.

From what has been said it will readily be understood that the prognosis was as to recovery bad, as to farther deterioration good. The defect, however, was so great as to render reading or writing practically impossible, involving the fixation point and 140° of the lower and inner portions of both fields of vision.

A CASE OF MONOCULAR MICROPSIA.*

By Arthur H. Benson, F.R.C.S.I.,

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Assistant Surgeon to Saint Mark's Ophthalmic Hospital.

Miss F. B., aged 24, consulted me at the City of Dublin Hospital in consequence of a discomfort she experienced by reason of the different apparent size of objects seen with each eye. She first consulted Dr. Hearn, of Co. Cavan, to whom I am indebted for the case.

History.—Three years ago she was afflicted with "heart disease." Had pains in heart, and in head (frontal); these latter were made worse by reading. Fourteen months ago, *i.e.* in April, 1884, she had an attack of undoubted, though rather slight, diphtheria, followed by no paralyses. In October, 1884, she states that a dark shade seemed to come over the temporal side of the right field of vision; this appeared only at dusk, but in bright light was not seen. When the candles were lit she saw the flame "mitred" and divided into prongs of light above. The frontal headaches were a good deal worse after the diphtheria, and pain was also felt severely in the back of the head. About the same time (October, 1884), *i.e.*, six months after the diphtheria, she, for the first time, noticed that with the right eye things looked smaller than with the left. This symptom has not materially changed since then, things looking about as small now as then.

At Christmas, 1884, she had another very severe attack of the heart, with much pain and palpitations, which confined her to bed for four months. During this time she suffered from pains coming up from the left arm to the neck and head.

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* Communicated to the Meeting of the British Medical Association, Cardiff, 1885.

It was not till January, 1885, that she took notice of the fact that the right pupil was somewhat dilated, but she thinks that it may have been dilated before that time without her knowing it.

Present condition.—Patient is a slight but healthy-looking girl, who states that but for the eye and heart she would be perfectly well. The external appearance of the eyes is normal, except that the right pupil is semi-dilated, and acts rather sluggishly to light and accommodation.

The right pupil, facing good light, is 5.5 mm. in diameter, when accommodated for 15 cm. its diameter is 4 mm.

Left pupil, facing good light, is 3 mm.

Right vision $=\frac{6}{6}$??, and J. 1 at 18 cm. (punctum prox.)

Left vision $=\frac{6}{6}$?, and J. 1 at 14 cm. (punctum prox.)

The fundus is perfectly normal, but there is marked veinous pulsation; tension is normal also.

Tests.—Holding Jæger's test-types at 25 cm. the No. 1 seen with the left eye looked as large as No. 2 seen with the right eye, and distant objects, she said, looked little more than half their proper size with the right eye.

When a convex glass, + 0.5 D, was placed in front of the right eye distant objects seemed the same size with each eye. For near vision, when the right eye was armed with a convex, + 3.0 D, J. 1 at 25 cm. seemed the same size as with the left eye without a glass.

When we placed a concave glass, − 1.25 D, in front of the left eye the image seemed the same size as that of the right without a glass. This held good for both near and distant vision.

There was very slight anisometropia.

With the keratoscopic test the right eye had $H=+1$ D; the left eye had $H=+0.75$ D. Subjectively, R was improved to $V=\frac{6}{6}$ with + 0.5 D; left not improved by any glass.

A drop of eserin in the right eye made (after 20 minutes) objects seen at 25 cm., with it, almost as large as those seen with the left eye without eserin; but it never quite equalized the images.

These observations were several times repeated, and the results varied very slightly during two or three weeks whilst she remained under my care ; she, however, found the eserin made her very comfortable, and she considered herself greatly improved in consequence.

The cause of the micropsia here seems, without doubt, to be a partial ophthalmoplegia interna, pupil dilated, and accommodation diminished. The effort necessary to make the right ciliary muscle act to a given degree is now much greater than formerly, with the psychical result that the patient imagines the object *nearer* than it really is, and consequently (the retinal image being the same size) estimates the size of the object as being smaller. For we estimate the size of objects by the aid of many factors, one of which is the estimation of its distance.

There was no disease of the retina, specific or otherwise, to account for the micropsia.

The diphtheria will, I suppose, get the credit of producing the ophthalmoplegia interna, but there was an unusually long interval (six months) between the first illness and the paralyses, and the conditions seem to show no disposition to mend, which throws doubt on their diphtheritic origin.

THOMSEN (Berlin). On Contraction of the Field of Vision in Epilepsy.—*Berlin, Klin. Wochenschrift*, 1884, *No.* 24. *Abstracted in Boston Med. and Surg. Journal, Jan.* 22, 1885.

HERMANN WILBRAND (Hamburg). On Concentric Contraction of the Field of Vision in Functional Disturbances of the Cerebral Cortex, and on Incongruence in the Defects of Hemianopia. *Klin. Monatsbl. f. Augenheilk. Feb.*, 1885, *p.* 73.

In an elaborate paper of forty-two pages, Wilbrand discusses the occurrence of concentric contraction of the field of vision as the result of disturbance of the visual nervous apparatus behind the optic commissure. Partly from the nature of the subject, partly, perhaps, from the style in which the author writes, we find it difficult in places to thoroughly grasp his meaning, but the article has so much that is new and ingenious in it that we desire to call particular attention to it, and all the more because Wilbrand's explanation of this class of visual defects is essentially opposed to one which was suggested in these pages a few months ago *(Reflex Amblyopia, O. R., Vol. III., p.* 129).

The following abstract of a paper by Thomsen, of Berlin, may with advantage be introduced here. Wilbrand's analysis of the question commences with a reference to Thomsen's observations.

The anæsthesia which manifests itself as a concentric contraction of the visual field, and which is frequently associated with disturbance of the cutaneous sensibility and of the special senses, has hitherto been regarded as almost characteristic of hysteria. Thomsen made a systematic perimetric examination of twenty-eight male and fifty-one female patients in the department for the insane and epileptic in the Charité, and discovered that sensory anæsthesia occurs not alone in hysterical patients, but also in epileptics, and in a connection with the epileptic attack which, under certain conditions, may be regarded as the rule.

When the attack is a purely motor convulsion, that is, when no disturbance of consciousness or emotional disorder is combined with it, the field of vision is not contracted, but has the same normal extent after the attack as before.

On the other hand, concentric contraction of the visual field, either with or without disturbance of the cutaneous sensibility, of the functions of the other special senses (hearing, smell, taste), and of the muscle sense, is found after, or with, the following conditions :—

(1) After an epileptic attack when delirium with hallucinations follows it ;

(2) After post - epileptic mental bewilderment, stupor, so-called epileptic mania, etc. ;

(3) After almost all similar conditions, with or without disturbance of consciousness (attacks of dread and oppression, sudden waking at night with spasmodic sensation, wetting the bed, so-called motory or sensitive aura, etc.) ;

(4) With more lasting post- or inter-paroxysmal conditions, which leave consciousness intact, but are attended by emotional depression and excitability. The patients are dejected in spirit, their psychical balance is unstable, they complain of all sorts of nervous sensations (palpitation, trembling, flushes of heat, ringing in the ears, glimmering before the eyes, persistent headache, and sleeplessness).

All these conditions produce narrowing of the visual field; during their disappearance the field again enlarges gradually or rapidly (it may be in twenty-four hours) to its normal dimensions. The contraction of the field is always concentric, never hemianopic, but is often much more pronounced on one side. The concentric contraction is associated generally, but not always, with diminished acuteness of sight.

The cause of the epileptic attacks, which are attended by contraction of the field, is, in all probability, to be sought in a disturbance of the circulation of the cerebral cortex, which only gradually passes off, while, with the pure motor attack, the disturbance disappears immediately. That the cortex is the part affected is shown by the constant implication of the psychical functions.

With regard to the last conclusion Thomsen acknowledges that it involves a difficulty, the solution of which he has not been able to find. Organic lesions of the cortex of the posterior lobe induce hemiopic defects, not concentric contraction of the field. Are we then to abandon the idea that the visual disturbances in question are localised in the cortex, or must we assume that the so-called functional disturbances have an effect altogether different from that which is produced by an organic lesion?

Wilbrand declines to admit the slightest doubt as to the anatomical fact of a semidecussation of the optic fibres at the commissure, and gives an explanation which brings this fact into accord with the equally well-established fact of a concentric contraction of the field in certain forms of cerebral disturbance. He begins by pointing out that although such cases have rarely been observed, it is not difficult to imagine the occurrence of organic cortical lesions of a kind which would produce binocular concentric defects in the field of vision. Thus, if we imagine an exactly corresponding lesion in that portion of each occipital lobe which represents the central area of the retina, we must assume the production in each eye of a similar concentric central scotoma; and if we imagine more extensive lesions which spare precisely the above-named cortical areas, we have an intelligible cause for concentric contraction of the two fields with preservation of the central areas. Organic lesions of such a kind must, in any case, be rare; we can hardly imagine their occurring suddenly through symmetrical extravasations of blood; they might perhaps with less improbability be ascribed to a bilateral specific meningitis. They are here suggested, however, simply to show that the anatomical semi-decussation of the optic fibres does not absolutely preclude the dependence of concentric visual defects upon organic cortical lesions.

Turning now to functional disturbances, it is to be noted, that while in certain cases the visual defects are distinctly hemiopic, there is a large group comprising neurasthenic asthenopia, hysterical amblyopia, and other allied conditions, in which they are of the concentric type, the central area of the field being more or less intact—a condition completely analogous with that observed by Thomsen and Oppenheim in post-epileptic and other forms of sensory anæsthesia. The frequent association of these transitory disturbances of vision with such symptoms as attacks of vertigo, slight hemiplegic seizures, temporary loss of speech and memory, &c., and the fact that in some cases they appear to occur vicariously with epileptic seizures, point strongly to their cortical origin.

It is difficult to imagine that the hemiopic and the concentric types of visual disturbance, clinically so closely allied, are essentially different in their mode of origin, and we may at once admit a close relationship between them if we suppose that the concentric defect is nothing more than the double of the hemiopic defect—in other words, that it is due to the simultaneous occurrence of similar disturbances in both cerebral hemispheres, either of which alone would produce a transitory loss of vision of the hemiopic kind. Thus it may be supposed that during an epileptic seizure involving the visual centres, the function of these latter is, for the time being, entirely suspended; as the seizure passes off the function gradually returns, and first in that portion of the cortical area which represents the centre of the retina, for in this portion it is under all circumstances the most vigorous. The perception of form and of light decreases regularly from the centre of the field of vision to its periphery, so that if we regard the acuity of vision in the fixation point as 1, it becomes $\frac{1}{30}$ to $\frac{1}{50}$ in the intermediate parts of the field, and $\frac{1}{70}$ in the periphery, *i.e.*, objects to be recognised by the peripheral parts of the retina must (the illumination being equal) be seventy times as large as those recognised by the fovea centralis. Consequently an evenly intense functional disturbance of one whole visual centre would be compatible with the existence of functional activity in the macular region, while the peripheral parts of the visual fields were still functionally incapable. An examination made at this stage will therefore reveal a contracted but gradually enlarging field of vision. If the disturbance affect one hemisphere of the brain only, the visual defect will be of the hemiopic kind ; but if, as more frequently happens, both hemispheres are affected, both halves of both retinæ will be involved, and we shall find concentric contraction of the fields such as has actually been observed. The severer the attack the slower will be the return of the visual function, and the more narrowly will it be limited for a time to the macular area—that is to say, the smaller shall we find the field to be at any given time during the period of recovery.

The foregoing explanation is met at once by a difficulty. It cannot be supposed that the disturbance of the visual centres is always equally intense in the two hemispheres, and if it be unequal a corresponding inequality should be present in the two halves of each retina ; thus if the right cortex be more affected than the left, the left half of each field of vision should show a greater concentric contraction than the right half. The outline of such a field would, therefore, show an abrupt interruption above and below, on the line of the vertical meridian.

Wilbrand gives diagrams showing the appearances which such fields would present if accurately mapped. He calculates the forms of these fields in a novel manner, thus : assuming the horizontal meridian outwards to be contracted from 90° (normal) to 40°, he expresses this by the fraction $\frac{40}{90}$, and then contracts each other meridian proportionately, the formula being $\frac{40}{90} = \frac{x}{M}$, M being the normal extent of the field in the meridian in question. He suggests that many of the contracted fields which come under clinical observation would be found to present this unequal contraction in the two halves, if tested with special regard to it; the sudden interruption of the outline on the vertical meridian would only be discovered by a careful comparison of the meridians lying immediately to the right and to the left of the vertical.

He further attempts to explain the fact that in many cases the field of one eye shows a much higher degree of contraction than that of the other. We are accustomed to speak of the right and left *halves* of the two visual fields, meaning the areas respectively associated with the two optic tracts, but the actual division of the field of each eye is an unequal one, the inner "half" comprising about one-third of the whole area, the outer half about two-thirds. Thus the right tract, for example, governs about one-third of the field of the right eye, and about two-thirds of the field of the left eye. Hence it is natural that a disturbance in the right hemisphere should affect the field of the left eye more extensively than that of the right. If both hemispheres be disturbed, the one more severely than the other, the effect is greatest in the eye on the opposite side to the disturbance, and though both halves of both retinæ are contracted the total area of the field of the opposite eye is reduced much more than that on the same side. It is true that of the two inner halves of the fields the one on the same side suffers most, but the effect on the inner halves is much less considerable than that on the outer halves.

The temporary defects of vision caused by functional disturbance of the visual centres are best studied by comparing them with their analogues, the fixed defects due to permanent lesions of the brain. With regard to these latter, we know that though they are always formed on the hemianopic type, they present very various degrees of congruity in the two eyes. In some cases the affected areas are exactly similar, while in others they differ greatly. The semidecussation of the optic nerves involves the hemianopic type in all cases in which the lesion is behind the commissure, but an absolute similarity of defect in the two eyes would imply a precision of anatomical structure, which is certainly not always present. The ideal arrangement of the visual apparatus is one in which we may picture the two retinæ as consisting of a vast number of minute areas, each area in the one eye corresponding to a similar area in the other, and each pair connected by means of their nerve fibres with a single minute area in the cortex of the occipital lobe; further, the visual area in the one lobe must be precisely similar in size, position, and minute arrangement to the visual area in the other. Under these conditions a lesion involving any part of the visual area in either hemisphere would produce absolutely similar defects in the corresponding halves of the two fields, and bilateral lesions, if exactly similar, would produce exactly similar defects in the two halves of each field. That such absolute congruity is seldom met with may be explained by assuming, what is highly probable, that the structural arrangements and connections of the parts in question fall short of the ideal type.

In the first place we know, as above stated, that the division of each field is unequal, a larger part belonging to one hemisphere of the brain than to the other, and consequently that the blind areas in hemianopia, though they may be similar in shape, cannot be identical in size.

In the second place it is probable that corresponding areas of the two retinæ are less closely blended in the cortex than the ideal arrangement requires. Wilbrand gives diagrams to illustrate this point. In one he shows the two sets of corresponding fibres, intimately blended at their terminations in the cortex, according to the ideal type; in another he shows a partial blending; in a third he makes the two sets terminate in two distinct but closely adjacent areas, which, on surface view, might be compared to two adjacent countries on a map. In the second, and still more in the third case, it is obvious that a lesion of limited extent might affect the two sets of fibres unequally and produce unsymmetrical defects in the two fields.

In the third place it is possible that the visual centres in the two cerebral hemispheres may be unsymmetrical both as regards their minute arrangement and their total extent.

Bearing in mind these supposed variations of structure, it is easy to account for the very various degrees of symmetry met with in cases of hemianopia due to permanent lesions of the brain. Wilbrand cites a series of recorded cases bearing upon the point. Applying the same idea to cases of functional disturbance, he shows that the concentric limitations also will naturally vary a good deal from the ideal types which we should be inclined to look for.

In conclusion he points out what are the characteristic differences between the effects of structural and of functional disease in the visual centres. Structural lesions, being usually unilateral, cause homonymous hemianopia, partial or complete; the defects in the visual fields are sharply defined both for white light and for colour; they show no considerable differences under varying illumination or with different sized test objects; and they do not vary within short periods of time. Functional disturbances, if unilateral, cause transient loss of vision, partial or complete, of the hemianopic kind; they are, however, commonly bilateral, and then cause concentric contraction of both fields, with various degrees of symmetry or asymmetry, according to the relative intensity of the disturbance in the two hemispheres, and certain variations in the anatomical arrangement of the parts concerned. The outline of such fields is not sharply defined; it varies with the illumination and with the size of the test object; the loss of vision is not absolute in the affected area, either for white light or for colour, but is merely a depression of function more or less marked in each zone of the retina, according to its physiological activity; the field varies much in size within short periods of time and may return rapidly to the normal.

FERRIER (London). **On the Motor Roots of the Brachial Plexus, and on the Dilator Nerve of the Iris.** *Proc. of Roy. Soc., Vol. XXXV.*, 1883, *p.* 229.

In this paper Ferrier in the first place corrects the anatomical account of the brachial plexus in the monkey, given in a paper by Yeo and himself on the "Functional Relations of the Motor Roots of the Brachial and Lumbo-sacral Plexuses" (*Proc. of Roy. Soc., Vol. XXXII*, 1881, *p.* 12), and records the results of four experiments directed specially to the investigation of the dilator nerve of the iris. As the anatomical point bears directly on that part of Ferrier's communication with which we are now concerned, we must refer to it. The nerves ordinarily described as entering into the brachial plexus in man are the anterior primary branches of the 5th, 6th, 7th, and 8th cervical nerves, and a branch from the 1st dorsal. Cunningham, however, showed, some years ago, that in 73 per cent. or more, the second dorsal nerve sends a communicating branch to the plexus. This is the normal anatomy in the monkey, the anterior division of the second dorsal nerve giving off three almost equal branches—a communicating branch to the first dorsal nerve, the second intercostal nerve, and a branch to the inferior cervical ganglion of the sympathetic. Stimulation of the motor root of the second dorsal nerve in the monkey was found by Yeo and Ferrier to cause contraction of the intrinsic muscles of the hand and inclination of the head to the shoulder of the same side. The thumb is adducted and the fingers flexed at the metacarpo-phalangeal joint. The distal phalanges are slightly extended, and the fingers spread. The transverse diameter of the hand is diminished, and the dorsal aspect rendered more convex. In one case where the pupil was specially observed during stimulation of all the motor roots from the fifth cervical to the second dorsal inclusive, no effect on the pupil was observed, although the usual movements of the limb occurred with regularity. The result of the further experiments recorded by Ferrier show, however, that stimulation of the anterior root of the second dorsal nerve will almost invariably produce dilatation of the pupil, while on the other hand stimulation of any other of the anterior dorsal roots has no effect on the pupil, unless the current used is so strong as to produce diffuse stimulation, when the pupil of course dilates. Two circumstances, according to Ferrier, may cause the result of stimulation of the second anterior dorsal root to be negative. The first of these is the strength of the current. A strength of current sufficient to excite the muscles of the limb or trunk to action frequently failed to cause any dilatation of the pupil when applied to the second dorsal. Somewhat stronger, but yet barely perceptible, on the tongue, the current at once caused the pupil to dilate. Again, after repeated stimulation of the second root, the iris failed to respond, probably from mere exhaustion of the nerve. The general result of these experiments, Ferrier concludes, is to show that in the monkey, and presumably also in man, the dilator fibres of the iris, contained in the cervical sympathetic, are derived from the anterior root of the second dorsal nerve.

In some remarks on a paper by Beevor, on "Two Cases illustrating the localization of Motor Centres in the Brachial Enlargement of the Spinal Cord" (*Brit. Med. Journ.*, 1885, *April 18th, p.* 784), Dr. Hughlings Jackson recorded an important clinical confirmation of the above experiments, and, if we remember rightly, Dr. Beevor subsequently stated that he also had observed a similar fact. In a case of progressive muscular atrophy, at a stage when the intrinsic muscles of the hand were almost the sole ones atrophic, Dr. Jackson found that the pupil on the same side was smaller than its fellow, and that it did not dilate when shaded. It would be well to have this observation further confirmed.

H. KNAPP (New York). **Cocaine, and its use in Ophthalmic and General Surgery.** *Archives of Ophthalmology, Vol. XIII., p.* 402, 1884.

Since the end of last year not a week has passed without its quota of communications to the medical papers announcing supposed discoveries as to the action and uses of cocaine. A very little reading would have saved much writing. The original paper by Dr. Carl Koller of Vienna, published in the *Wien. Med., Wochenschrift*, October 25th and November 1st, 1884, and translated verbatim by Knapp, in his article in the *Archives of Ophthalmology*, anticipated with very little exception all that has been published on the action of the drug. Subsequent communications have confirmed, extended, and to some extent explained Koller's original observations, which really "discovered" the drug, although it had been isolated, and even experimented with for over a quarter of a century. To anyone purposing to contribute to the journals we would recommend a previous perusal of Koller's paper, where they will find noted the local anæsthesia of cornea and mucous membranes to pain, touch, and temperature, produced by the application of a solution of cocaine, also the dilatation of the pupil, its character and duration, the widening of the palpebral fissure, the paresis of accommodation, and the vaso-constrictor action of the drug. The paper is as admirable for its caution in assertion, for example, in regard to the effect of cocaine upon the iris, as for its completeness and accuracy.

In his article, Knapp collects a large number of contributions from American and European observers on the action of the drug, incidentally twitting English ophthalmologists on their slowness in taking up the new remedy. He states the results of numerous careful observations on himself and his patients, and finishes his work with summaries of the pharmacology, physiological actions, and therapeutic uses of the drug. The account of the therapeutic uses is written by special observers in each department: by Knapp himself in Ophthalmology and Otology, by Bosworth in Diseases of the Upper Air Passages, by Hall in General Surgery, by Keyes in Genito-urinary and Minor Surgery, and by Polk in Gynæcology and Obstetrics. With the results in ophthalmology our readers are doubtless already acquainted, as they agree entirely with the observations recorded by Koller, and with those of Nettleship (O. R., Jan., 1885, p. 26). The excellent paper by Bosworth, especially his observations on the action of cocaine in asthma of nasal origin, in acute coryza, hay fever and laryngitis, and in bronchitis, acute and chronic, we would commend to the notice of English physicians, who we fear were even more dilatory than English ophthalmologists.

Into the precise physiological action of cocaine Koller scarcely enters in his paper, and here alone was room left for his successors to supplement his observations. Koller pointed out that the mydriasis produced by cocaine was not *ad maximum*, and that the pupil reacted to light and acccommodation, and contracted at once to eserine. Weber, quoted by Knapp (p. 35), observed that when the pupil is fully dilated with atropine, cocaine produces a further dilatation, and recommended a combination of the two to break down iritic adhesions. Vulpian, quoted by Knapp (p. 37), showed that the injection of cocaine into the veins of the dog is followed by symptoms similar to those produced by electrifying the cervical branch of the sympathetic.

In a paper read before the Ophthalmic Society, 11th December, 1884, Nettleship says: "Probably the retraction of upper lid, whitening of eyeball, and mydriasis are caused by spasm of muscular fibres innervated by the sympathetic. The very fleeting cycloplegia caused by the repeated use of the drug may be due to ischæmia of the ciliary muscle from spasm of its nutrient arteries."

At a recent meeting of the Royal Society, a paper was read on cocaine mydriasis, in which Jessop (*Lancet*, 1885, July 11th, p. 76) showed that in rabbits from which a piece of cervical sympathetic had been excised some days previously, and also in a patient presenting all the symptoms of section of the cervical sympathetic, the local application of cocaine had not the slightest effect on the pupil. On the other hand, the pupil of an excised and bloodless eye dilates after the instillation of cocaine. The experiments and observations recorded by Jessop seem to justify the conclusion that cocaine acts as a weak stimulant both of the vaso-constrictor and of the mydriatic fibres of the sympathetic, and that its action is local and requires complete integrity of the terminations of the cervical sympathetic in the eye. Snell records (*Brit. Med. Jour.*, 1885, July 25th, p. 153) the interesting fact that cocaine mydriasis disappears during chloroform narcosis, and reappears when the general anæsthesia passes off. This is in marked contrast with atropine mydriasis which is unaffected by general anæsthesia, and agrees with the theory that cocaine mydriasis results from muscular stimulation, atropine mydriasis from muscular paralysis. In connection with this it is well to remember the fact mentioned by Ringer, that during chloroform narcosis the pupil is normally contracted, stimulation of the cervical sympathetic not dilating it, but that on the approach of death the pupil dilates widely, the dilatation being further increased by stimulation of the cervical sympathetic.

W. UHTHOFF (Berlin). Optic Neuritis and Multiple Sclerosis. *Berlin Klin. Wochenschr.*, 1885, *No.* 16.

Uhthoff adds to the already published cases of optic atrophy associated with multiple sclerosis, the following:—

CASE I.—A woman, aged 35, affected eighteen months, the first symptom being sudden contraction of the upper extremities, followed by headache, vertigo, trembling, weakness, &c. On examining, marked trembling was found in all the limbs and the head, muscular weakness best marked on left side, exaggerated patellar klonus, considerable rigidity of lower limbs, the tongue, too, affected, and occasional vomiting. Eyes almost amaurotic ; right recognised the hand at one foot distance, left uncertain perception of light. Pupils moderately dilated, almost reactionless. Papillæ inflamed, greyish red, with hazy margins, tortuous veins, slightly swollen, and with some radial striation. Small retinal hæmorrhages in neighbourhood of discs. Movements of globes restricted, slight nystagmus. About two-and-a-half months later there was found the appearance of pure atrophy with sharply marked borders to the discs, except on the inner side of the left papilla, where a little haze remained. (This rapid disappearance of optic neuritis has been observed by Uhthoff in other cases of papillitis in multiple sclerosis.) The sight of left eye was unaltered, that of right improved to counting figures at two to three feet, and the field of vision was restored in an excentric spot lying in the outer lower quadrant.

Case II.—A man, aged 36. Present condition : The region of facialis normal, speech apparently normal, though patient complains of its being slower and more difficult. Occasional frontal pain, no vertigo. Writing tremulous. Trembling of upper extremities only occasional, and that only when performing delicate movements. Muscular power of arms, good. Gait difficult, stiff and tremulous. Muscle klonus of lower extremities well marked. Exaggerated tendon reflexes, patellar klonus. Constipation, difficulty in voiding urine. No defect of sensibility. Ophthalmoscope : Left eye, normal. Right, slight atrophic whiteness of disc, outer portion most affected. V = 1. Field, normal. There was paresis of left rectus sup. and levat. palpebræ. Some eight months previously the patient had consulted an oculist for a sudden attack of blindness, which had so reduced his vision that he could merely observe the movements of the hand at thirty cm. The field was contracted upwards, inwards, and downwards, up to the point of fixation, and well marked optic neuritis was present. The vision and the field gradually resumed their normal proportions, and merely a slight discolouration of the papilla remained to indicate the past neuritis.

Case III.—A man, aged 23, with well-marked symptoms of disseminated sclerosis of about six months' standing; right eye $V = 1/2$, field normal, and fundus oculi normal; left eye $V = \frac{1}{13}$ Sn. III., central scotoma for red and green. Periphery of field normal, temporal half of papilla atrophic, upper border of disc a little hazy.

Adding the above cases to the four already reported by Gnanck, Uhthoff arrives at the conclusion that neuritis must be of relatively frequent occurrence in multiple sclerosis, and owing to the observed rapidity with which the inflammatory signs disappear in this form of neuritis it is probable that its frequency is much greater than statistics demonstrate. This may be admitted in spite of the fact that atrophy of the papilla does occur without antecedent papillitis. In cases also of retrobulbar neuritis without papillitis atrophy of the papilla has been frequently observed.

The character of the whole blindness is incompatible with the theory of a simple process of degeneration being its cause. Its sudden origin and rapid development, combined with its capacity for complete disappearance, the usually partial implication of the nerve, the frequency of cases with central scotoma and normal periphery, all point to neuritis rather than degeneration as the cause.

Uhthoff considers our present knowledge insufficient to determine exactly what are the precise pathological processes at work in the optic nerve in these cases, but he believes that in certain cases (possibly in those where a high degree of blindness accompanies the outbreak of neuritis) the pathological changes in the papilla are the same as those occurring in the brain and spinal cord. In other cases it is possible that the papillitis may be only secondary to the development of patches of sclerosis in the posterior portion of the optic nerve, and in yet a third group it may be that the papillitis is related to the accompanying cerebral disease merely in the same way as are the "choked discs" found in other intracranial affections, but Uhthoff is not inclined to give much weight to this third hypothesis. Further pathological investigations will no doubt clear up this interesting question.

A Reading Machine for Schools. *Klin. Monatsbl. f. Augenheilk, May*, 1885, *p.* 254.

The so-called reading machine of Fielitz is a simple apparatus by which reading is taught without the disadvantages of the stoop of the body and the strain of the eyes which attend the ordinary methods. It consists of a frame of the size of a common black-board in which letters can be placed at pleasure in any order, so as to form syllables, words, or sentences.

A teacher writes to the journal above named, stating her own experience of the great advantages to be derived from the use of this apparatus.

A cramped and stooping position during the reading lesson is entirely avoided. The object looked at being somewhat above the level of their eyes, the children naturally sit with their heads upright and rest against the backs of the seats, a position which they can maintain for an hour together with little fatigue. They can hold up their hands, and stand up to answer questions, useful practices for the sake of change of position, without losing the place, as they constantly do in learning from the book. In a large class it is impossible so to control all the children as to ensure that each one keeps its attention fixed upon the same word on the page of the book, but with the moveable letters on the wall the attention of the whole class is directed to the same point ; all watch the formation of the words in progress with eager interest, and if one here and there should be inattentive, his averted face is immediately noticed by the teacher. The manner of moving and fixing the type is so simple that it can be done easily by the children themselves, a valuable means of arousing attention, and of rewarding those who take pains.

A similar contrivance is sometimes to be seen in infant-schools in England, but is, we believe, not very generally employed.

It is most satisfactory to learn that a method of instruction which has such obvious advantages from the hygienic point of view, is found to be a practically good one by the teacher.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

FRIDAY, JULY 3RD, 1885

JONATHAN HUTCHINSON, F.R.S., President, in the Chair.

ANNUAL MEETING.

Reported by DAWSON WILLIAMS, M.D.

The customary business of the Annual Meeting was transacted.

Proptosis and Optic Atrophy.—Mr. Marcus Gunn showed a living case of symmetrical enlargement of the upper half of the face, with proptosis, optic atrophy, and anosmia. The patient, a female, aged 22, married, began to suffer neuralgia in both temples about eleven months ago, and vomiting set in when she was two months pregnant with her first child. The neuralgia has continued. The sight of the left eye began to get dim two months before her confinement in February last. Two days before the birth, she became quite blind in the left eye, and remained so for one month, when the vision gradually improved until June 5th, when she again became suddenly blind in this eye. The day after the birth, she became suddenly blind in the right eye, and continued so for a fortnight, when the vision of that eye steadily improved. Two months before confinement, the face became slightly swollen, and the eye-balls prominent; these symptoms considerably increased. The patient has objected to see anything of a blue colour. No history of fits or syphilis. Face very pale and puffy; considerable prominence of both eyeballs, and swelling of upper part of face, very marked in the eyelids. Deformity of the face bilaterally symmetrical. Thickening, and marked tenderness over the whole of both superior maxillary bones, and over the ramus of the jaw on both sides, and especially near to the zygomatic processes. Complete anosmia. Pupils of medium size, right active to light, left barely so. Both optic discs atrophied; the veins large and rather tortuous. No albuminuria. Patellar reflexes normal. Facial paralysis set in suddenly today (July 3rd). Antisyphilitic treatment had been of no avail.

Congenital Aniridia.—Mr. Lang showed a mother and son in both of whom the iris on both sides was totally deficient;

both patients had lateral nystagmus ; the mother had a lamellar cataract in the left eye ; the right eye had been cataractous, and had been operated on unsuccessfully ; the child had striæ in both eyes. The mother had had two other children ; the second had aniridia ; the boy shown was the third. The eldest child presented no deformity.

Double Glioma.—Mr. Lang showed a child who had first come under his care when sixteen months old, in March, 1882 ; the right eye was then excised for glioma ; the left appeared healthy, but in January, 1884, the patient was again brought with a growth in the left eye in the front part of the retina at the inner side ; the growth was now of considerable size. A secondary growth subsequently developed in the episternal notch.

Dr. W. A. Brailey remarked that the growth was so very exsanguine that, but for the history of disease in the other eye, the diagnosis would have been difficult.

Mr. Lang said that microscopical examination of the growth in the other eye left no doubt as to its nature.

Tubercle of Choroid.—Mr. Lawford exhibited microscopic preparations of a tubercular deposit in the choroid, obtained from the right eye of a child aged 5 years. The growth had been observed with the ophthalmoscope during life, as a yellow patch surrounded by a grey halo in the yellow spot region, and a sketch was made of it. The child died of tubercular meningitis ; at the necropsy, miliary tuberculosis of the lungs, heart, and liver was found. Microscopically, the nodule in the choroid presented all the evidences of tubercle, except the presence of the bacilli tuberculosis, which, though carefully looked for, were not proved to be present. Bacilli were easily obtained in specimens of the meninges taken from the base of the brain of the same patient.

Reflex Ophthalmitis.—The discussion on Mr. Hutchinson's paper of May 14th was resumed. Mr. Hutchinson briefly recapitulated the theories which have been advanced by writers on sympathetic ophthalmitis. (1). That the second eye becomes affected owing to disturbance of atrophic centre for the eyes the existence of which is assumed. (2). That the inflammatory process passes by continuity of tissue along the optic or ciliary nerves, their lymph-spaces or their connective tissue surroundings, from one eye to the other. (3). That the infective agent is transferred by the blood-circulation and becomes active in the other eye either because it is arrested by the small size of the capillaries and the favouring influence of light (Berlin), or because the infective elements find a suitable nidus in tissues of precisely similar character in the fellow organ (Hutchinson). Professor Berlin's theory predicates the existence of germs, Mr. Hutchinson's does not.

Mr. Power urged that by the President's theory many facts were left unexplained. How were the greater frequency and rapidity of the disease in children than in adults to be accounted for? Wounds of the ciliary region were much more apt to produce sympathetic ophthalmia in children than in adults; he had been accustomed to attribute this to their restlessness, the wanton removal of bandages, and the difficulty of keeping young children in a dark room for many weeks, owing to the injurious effect on their general health. He thought that there was strong evidence that sympathetic ophthalmitis extended from the eye originally diseased by continuity of tissue. It was true that a very considerable interval might elapse; this was a difficulty on any theory. He quoted one case of foreign body in the eye (a rivet impacted in the optic nerve), where, for twelve years, frequent attacks of inflammation occurred in the injured eye. How was it that this patient could go about for so long without suffering from more than slight sympathetic ophthalmia? He also referred to cases of relapse after apparent recovery from sympathetic ophthalmia. These occurrences appeared to be explicable upon the theory that the inflammation travelled along the nervous tracks better than by the theory advanced by Mr. Hutchinson.

Mr. Spencer Watson pointed out, as an objection to the blood theory, that other sense-organs, the ear for example, do not suffer from sympathetic inflammation, the only possible instance of its occurrence elsewhere being the occasional sympathetic affection of joints. Seeing that the eye is the only sense-organ where the anatomical arrangements afford a ready channel for the transference of inflammation by continuity of tissue, and that this is the only organ which suffers in the manner in question, this mode of transference seems highly probable. He did not agree with Mr. Power that children suffer more than adults from sympathetic ophthalmia; he thought they bore wounds of the ciliary region better than adults.

Dr. Noyes (New York) said that the active theory of the day was that of propagation by bacilli. All the theories fell under one of three categories: the agency of nerves, the agency of lymph-channels, or the agency of bacilli. All these were, he thought, wanting in scientific basis, and he had not arrived at any final opinion. It was necessary to distinguish between sympathetic irritation and sympathetic inflammation. The theory which attributed sympathetic inflammation to the agency of bacilli taught that, if the first eye were septically infected, the second eye became the seat of sympathetic inflammation; whereas, if the first eye were not affected by a septic inflammation, then the second eye suffered from sympathetic irritation. He referred to cases of trigeminal neuralgia accompanied by herpes zoster ophthalmicus, where the eye of the affected side was lost, with sympathetic affection of the other eye. An objection to the nervous theory was, that wounds of the ciliary region were not invariably followed by sympathetic affections. A shrunken eyeball might be very sensitive, and yet no neurotic irritation might ever be produced. He had observed two cases in which the removal of the cicatricial tissue at the apex of the orbit was followed by a relief of the sympathetic symptoms of the other eye. It was true that excision of a portion of the optic nerve was not always successful, but von Graefe used to perform subscleral division of the ciliary nerve with success. He especially desired to urge that, before resorting indiscriminately to excision of the eye, the possibility of saving the eye with useful vision should be fully discussed. He hesitated much more now than he formerly did in advising excision.

Mr. Nettleship said that the theory of blood-infection would account for the simultaneous appearance of changes, such as neuro-retinitis and iritis in widely different parts of the eyeball. The difficulties in the way of accepting the theory were, that it was hard to understand how the incubation period could ever be so long as it sometimes actually was, or why the disease should break out in the sympathising eye at a considerable interval after the removal of the infecting eye. Two other questions might be asked which would perhaps tell as much against as for the theory under consideration. How could exceptional but well-attested cases be explained in which parts outside the eye, such as the eyelashes, underwent organic change in the course of sympathetic inflammation? and how was it that the exciting eye might be but slightly damaged, though the sympathising eye suffered profoundly, even to total blindness? The severity of the disease in the sympathising eye must, he thought, be dependent upon the number of germs which it contained; if these were bred in the exciting eye, why did it not suffer in proportion? On the other hand, if they were not simply carried by the blood, but multiplied in it, how did the other tissues of the body escape serious change? As regarded the theory of direct transmission by continuity of tissue, there were difficulties in regard to all the paths along which the disease had been thought to travel. Deutschmann's view that septic inflammation was conducted along the optic nerves met with a certain amount of support from clinical facts. Failure of sight, papillitis, or papillo-retinitis were, for instance, among the earliest phenomena of the disease, and in cases of traumatic inflammation of the eyeball, it had been proved that inflammation could travel up the optic nerve. But iritis or keratitis punctata had been present in all cases, or nearly all, which had shown early retinal or neural changes, and all these phenomena might be accounted for upon the supposition of inflammation of the choroid. The clinical proofs that were required in support of this theory were, that the changes should appear at the disc some time before they were seen in other parts of the eye, and that failure of vision should precede the other visible alterations. Again, according to the transmission theory, basic meningitis ought sometimes to be seen as a sequel. In mild cases too, on the optic nerve theory, the disease should sometimes be confined to the optic nerve, but except, possibly, in a case of Dr. Brailey's, this was hitherto unknown. Again, in retrobulbar neuritis there was no evidence that the inflammation ever spread upwards to the other eye, though it went downwards to the disc on the same side. The chief objection to the theory of transmission along the filaments of the fifth or sympathetic nerves was that the path would be so very long and narrow; the nerve-twigs, however, were difficult to examine, and inflammatory changes might escape detection.

Dr. Mules thought that sympathetic irritation and inflammation, though they had some symptoms in common, ought to be separated. The connection between them was that the former dilated the lymph-spaces, and so allowed the more easy transit of infective elements. As to the difficulty raised with regard to the long interval between the injury and the sympathetic inflammation, he did not think that that was conclusive against the bacterial theory. It was not known how long a period might be necessary for their passage along the lymph-spaces. In reply to Dr. Brailey, he said that it was difficult to say whether the micro-organisms must be invariably introduced.

Dr. Brailey compared the evidence in favour of the President's view with that which seemed to support one of the most recent and plausible of the other views, the theory of direct transmission along the substance of the optic nerve or the sheath-space around it. In favour of the former was the fact that cells from a choroidal sarcoma were transmitted through the blood to other organs, such as the liver. But, on the other hand, he knew of no instance in which they had lodged, and produced a sarcoma in the choroid of the opposite side. Similarly, a purulent ophthalmitis might produce a purulent meningitis without any direct continuity, but it did not produce a purulent choroiditis of the opposite side. Again, there was some little physical evidence in favour of direct transmission, namely, the finding of inflammatory cells after enucleation in the loose tissue between the nerve-sheaths; there was also the case recorded by Snellen, where an injury to one eye resulted not only in sympathetic disease of the other, but also in total deafness, with every symptom of acute meningitis; and, finally, the experiments of Deutschmann, who produced papillitis of the one eye by injections into the vitreous body of the opposite.

The President said that the arguments used had not convinced him that his theory was untenable, though he was not prepared to adopt it strongly. It was a theory that was applicable to other diseases, such as multiple periostitis. He agreed with Dr. Noyes that excision of the injured eye after the development of sympathetic inflammation did no good, and ought not to be performed if there were any hope of useful vision in the injured eye. The occurrence of relapses was not conclusive against the theory, for inflammation in any situation might recur when an organ recovering from inflammation was again exposed to irritation. With regard to the argument used by Dr. Brailey, it was to be noted that occasionally a malignant growth of one eye did recur in the other. The sequence of the development of secondary growths in cases of malignant disease was very irregular; the intervals were sometimes very long; further, it was not safe to argue from the behaviour of one class of morbid element what would be the behaviour of another; for instance, from the behaviour of malignant elements to that of inflammatory elements. In reply to Mr. Jessop, he said that he did not agree with Mr. Spencer Watson that children were less liable than adults to sympathetic inflammation.

Concluding Business.—As this was the last meeting of the session, two papers, one by Mr. Critchett, on a case of Extreme Retinal Irritability, and the other by Dr. Walter Edmunds and Mr. Lawford, on the Pathological Anatomy of Optic Neuritis, were taken as read.

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NOTE ON THE AFTER-TREATMENT OF CASES OF CATARACT EXTRACTION.

By George A. Berry, M.B., F.R.C.S., Edinburgh,
Ophthalmic Surgeon Edinburgh Royal Infirmary, etc.

There are few points which to the practical oculist are of greater interest than the after-treatment of his extraction cases. Long after he has settled down to some routine in the method of performing the operation for removing a cataractous lens, a routine from which he will only deviate for some very good reason, he may remain in doubt as to whether in the after-treatment of his cases he has taken every possible precaution to diminish the risks of the healing process. This, at any rate, has been my own case.

With the object of seeing the practice of others in this matter I visited this year a number of the principal clinics in Germany, Denmark, and Holland. When, therefore, I presume to recommend the treatment which I have since adopted, it is not because it is any hobby of my own but because it combines what I believe to be, from a practical as well as scientific point of view, the best elements in the treatment of some of the most experienced oculists on the Continent, whilst it at the same time differs in no small degree from that which is mostly followed in this country.

A few remarks must first be prefaced as to the treatment immediately before and during operation. Before operation the conjunctival sac is thoroughly washed out with a solution of corrosive sublimate (1 : 5,000), and care is taken that the instruments are not only clean but aseptic. Those which are or may be introduced into the eye are cleaned in absolute alcohol and then immediately afterwards laid along with the others in carbolic acid lotion (1 : 20), from whence, before being used, they are transferred into a saturated solution of boracic acid, which is less irritating to the eye. So much for the means used to avoid the first and, I believe, the most serious source of danger in the operation, viz., the introduction into the eye of any foreign matter, septic or aseptic. That every effort should be made to avoid sepsis I regard as an absolute duty, as it is not merely a question of greater or less success in an operation, the result of which is such as rarely to leave the sight of the eye worse than before, but it is a question of the avoidance of the possibility of sympathetic inflammation of the other eye, an inflammation which we are obliged to consider zymotic unless the remarkable experiments of Deutschmann can be shown to be fallacious; and this, again, clinical experience seems to render extremely unlikely.

The other two common sources of trouble I need only refer to, as probably few are not on their guard against them, viz., enclysis of the iris, and the leaving of cortical lens matter in the eye. They are, *per se*, less to be dreaded than septic inoculation, though when not obviated they may retard the healing, and thus come to be considered in the after-treatment.

The points in the after-treatment which one has to consider are :—

1. The nature of the dressing and the frequency with which it should be changed.
2. The length of time it is advisable to keep the eye bound up, and whether one or both eyes should be occluded.
3. The use of mydriatics or myotics.
4. The amount of light to be allowed in the room.
5. The length of time to be spent in bed.

First as to the nature of the dressing. With every previous tendency towards dry dressings, I have adopted and feel confident of the superior advantage of a *moist* *antiseptic dressing.* It must, however, be antiseptic, and need not be continued for more than two days after the anterior chamber has been re-established, *i.e.*, generally not after the first three days. The form in which I apply such a dressing is as follows:—After having frequently, during the operation as well as immediately afterwards, washed out the conjunctival sac with the corrosive sublimate solution already mentioned, a piece of lint dipped in the same solution is applied over the gently closed lids, and on the top of this first a piece of gutta-percha tissue, and then a pad of cotton wool, the whole being retained in position by means of a light flannel or domet bandage (two inches wide), two or three turns of which are brought down over the eye after one turn has been made round the head. In cases where either a chronic conjunctivitis or epiphora exist, and there is, therefore, more or less risk of self-infection, a thick layer of finely powdered iodoform is applied directly to the wound in the eye before putting on the dressing. The dressing is changed after twenty-four hours, the eye examined, carefully bathed with the corrosive sublimate lotion, and then again dressed in the same way. If, as is generally the case, there has been a good chamber on the first examination, the wet antiseptic dressing, after having been renewed every twenty-four hours, is exchanged on the fourth day for a dry antiseptic one, which merely consists in a pad of fine absorbent cotton wool dipped in the corrosive sublimate lotion, and allowed to dry on the eye, to which it is bandaged as before. The advantage of such a wet dressing as has just been described lies not only in its antiseptic properties, but also in its preventing the accumulation of tears in the eye, which, under a dry dressing, frequently cause inconvenience to the patient and necessitate the early changing of the dressing.

With regard to the second point on which there is considerable difference of opinion, viz., the length of time the eye should be bandaged, I believe that when the anterior chamber has been re-formed within the first forty-eight hours, and the case done well, there is no harm in changing the bandage for a shade after from six to eight days. This is also the practice in most places. There is more difference of opinion on the question as to whether one or both eyes should be occluded. Two of the most experienced and skilful operators whom I have recently visited only bandage the one eye, and this course I have followed all the more readily, as I had previously been in the habit of removing the bandage very soon from the second eye; and, indeed, with proper care there seems no reason why the patient should not be allowed the very considerable comfort which leaving the one eye free brings him, and which undoubtedly enables him to submit with more cheerfulness to his treatment.

As to mydriatics and myotics; the latter I only use in the rare cases in which the extraction is performed without iridectomy and then only until the anterior chamber is re-established, the former only when there is a trace of iritis and more especially when this inflammation exists along with and is possibly caused by cortical remains.

Too strong light is certainly to be avoided, but there is, on the other hand, no necessity for either complete or partial darkness, especially when the patient is provided with a good shade. On the last point on which there may be difference of opinion, the length of time to be spent in bed, I am guided by the following considerations: For the first two or three days it is desirable to keep the patient as quiet as possible so that the bandage is not displaced or anything brought more or less forcibly in contact with the eye, and this is most easily secured by keeping him in bed; but the advantage to be got from the recumbent position is very much lessened whenever, as in very corpulent and more especially in diabetic individuals, it produces great restlessness and discomfort. In such cases one day in bed is sufficient, and with due care healing goes on quite as rapidly, if not more rapidly, by allowing the patient to sit up or even walk about. In other cases the patient is kept in bed for three days.

There are, of course, many ways of attaining the same end, and whilst advocating the line of treatment I have just described, which is for the most part, as I have already said, copied from the practice of Continental oculists of large experience, I do not insist on all or any of the details, but feel sure that the principles with which they are intended to comply, viz., the greatest safety, the least discomfort, and the least interference, must be recognised as correct.

ON A CASE OF CHRONIC GLAUCOMA OF UNUSUALLY LONG DURATION.

By Priestley Smith,

Ophthalmic Surgeon to the Queen's Hospital, Birmingham, and Consulting Ophthalmic Surgeon to the Birmingham Skin and Lock Hospital, and to the Kidderminster Infirmary.

The case recorded below is unusual in the following respects:—The diagnosis of glaucoma was made nearly twenty years before operative treatment was undertaken. An excess of tension was present at the beginning of this period, and was well marked at the close; but was probably intermittent throughout. Very deep excavation of the discs coexisted with good sight and only moderate contraction of the fields. Iridectomy gave an excellent result in each eye. I am able to establish the early history of the case with exceptional accuracy, for the patient was at that time under the observation of Sir William Bowman, and he has most kindly placed his records at my disposal.

Mrs. P., now aged 65, is a lady of fine physique and considerable force of character. She has, however, strongly-marked neurotic tendencies. At various times of her life she has been the subject of nervous disorders of considerable severity, *e.g.*, loss of power in the limbs, cramps, convulsions, neuralgic pains, &c., none of which, however, appear to have been due to organic changes. In the words of an eminent physiologist, to whom she has long been well known, her constitution is characterised by excessive sensibility of the vasomotor system. Her sight began to fail in 1865. The following is a transcript of Sir William Bowman's notes taken at that time and subsequently:—

"*Dec.* 30*th*, 1865.—Mrs. P., aged 45. Subject all her life to severe hysteria, cramps, convulsions—a very troubled and anxious life; has one child, and has to educate her herself. Eyes failing six months.

"*Jan.* 4*th*, 1866.—Always very hysterical, cramps, etc., excessive—always more on left side, overuse of eyes, and anxiety for a long time. Cold sensation in the eyes comes on after a quarter of an hour's use, during the last three months, often followed by halos round a candle, and in the right flashes of coloured light, all this increasing gradually. If tired, the sight worse. Eyes almost always aching. Fatigue comes on very soon on use. Light distresses; on going into the air the eyes water. Left field feeble at inner margin. R. T 1? L. T 1. Tendency to excavation, both, left most; no pulsation of vessels, no whiteness of optic discs. Pr. $\frac{1}{28}$ Em. Ordered perfect rest for three months. Quinine, a cooling lotion, and ether embrocation.

"*Mar.* 3*rd*.—Letter.—Less coldness. Pain the same, coloured flickering light continues, dimness decidedly increased. Won't be in London for some weeks. Advised to come; meanwhile complete rest of eyes and much shade.

"*March* 22*nd*.—Less coldness, but severe shoots through left three times a day. Coloured halos often—now frequent in the left, green inside, red outside. Sight flickers. Dimness comes on after reading half a page. I found both Tn. Both optic discs excavated. Decided feebleness of inner half of left field and some of inner part of right. Vision right $\frac{20}{30}$, left $\frac{20}{40}$. I made her read half an hour, when fatigue came on, but still Tn both. Ordered quinine and iron. Rest.

"*April 16th.*—Left pains as before, less coldness. Tn. Excavation as before. Pulsation not easily induced in left optic disc by pressure on globe. Potass Brom.

"*May 10th.*—Less pain, health better. Both Tn.

"*July 3rd.*—Better. Both Tn. Eyes still tire easily. Rest. A series of small blisters to temples.

"*Nov.* 1877.—I heard of her being in Germany. The eyes were well. She has had palpitations and other troubles, and the doctors alarmed, but she gets well.

"I did not see her again till the 16th May, 1885, when it was in company with Mr. Priestley Smith, and we agreed that Iridectomy should be done on both forthwith."

Mrs. P. first came under my own care in July, 1882. The immediate cause of her visit was a severe pain in the right eye, which proved to be due to a foreign body beneath the upper eyelid. Having previously heard through a mutual friend that she had suffered from glaucoma many years before, I took the opportunity of carefully examining both eyes, and found the following conditions:—

Right eye: Slight astigmatism (0·75 D, axis horizontal), being corrected $V = \frac{4}{12}$. $T + 1$? Media clear. Disc very deeply cupped, undermined, and with sharp rim,—a typical glaucoma cup of long duration. Field, contracted (not accurately tested).

Left eye: Slight astigmatism (0·75 D., axis vertical), being corrected $V = \frac{4}{12}$. $T + 1$? Media and disc as in other eye. Field, contracted (not accurately tested).

The patient described some difficulty of vision, sparks before the eyes and occasional feelings of discomfort, but it did not appear that any considerable impairment had occurred recently. Under these circumstances and with the history of a glaucoma of many years' duration, I was not disposed at once to recommend any operative treatment, but contented myself with explaining the future uncertainty of the case to a near relative of the patient.

I next saw the patient nearly three years later, viz.: on *March 30th*, 1885. She had recently noticed a further failure of vision, especially in the left eye, the field of which was now, I think, smaller than before. Central acuity appeared unchanged, or nearly so. Both eyes had distinctly $T + 1$, or more, and presented the same extreme cupping of the discs. The patient, who lives a long way from Birmingham, could not remain under observation. She was directed to use a very weak preparation of eserine.

May 13th.—I visited the patient at her own house. On my arrival at 5 p.m. the tension of both eyes was strictly normal; I convinced myself by more than one examination that both eyes were as slack as healthy eyes. At 11 p m. the same night, when she was tired and somewhat overwrought by superintending a strabismus operation upon one of the family, which I performed that evening, the tension was distinctly in excess, T + 1 at least, the pupils being decidedly larger than before. She described an unpleasant feeling in the head as though her brain were a sponge being squeezed at intervals. She frequently has this feeling when tired, and the eyes are then always worse. She said that her sight was decidedly worse during the last few months, and that she could now scarcely read at all. She had recently had fatigue and anxiety through the illness of a relative. I advised consultation with Sir William Bowman. This was carried into effect three days later, and Sir William, on the ground of the recent advance of the disease, advised operation. I had further opportunities during this time of noticing that the tension fluctuated in a decided manner, being sometimes normal, sometimes considerably in excess.

May 22nd, 1885.—(The day before operation):—
Right eye, with cylinder 0·75 D. as before $V = \frac{4}{12}$ badly; T + 1.
Left eye, with cylinder 0·75 D. as before $V = \frac{4}{18}$ badly; T + 1.

	20	10	15	30	30	40
Fields ...	35	L	30	25	R	60
	25	25	25	30	40	50

May 23rd.—Twenty grains of chloral hydrate by the mouth; twenty minutes later ether and chloroform inhalation. *Left* iridectomy upwards, the incision being made well in the sclera with a Graefe knife. Immediate effect, full relaxation of tension. Normal healing without pain.

In presence of such extreme cupping of the discs I feared that the operation might be followed by further loss of central acuity, and therefore operated first upon the worse eye, and awaited the result before dealing with the other.

May 28*th*.—Vision of the operated eye, roughly tested, certainly not worse than before the operation. *Right* iridectomy upwards, under same conditions as before with, similar result.

The left eye had an excess of tension at the time of operating, and prolapse of iris followed completion of the section. The right had normal tension at the time of operating (probably by reason of prolonged rest in bed) and no prolapse occurred. Healing equally good in both.

June 19*th*.—Tn in both, and has been so at every testing since the operations. $V = \frac{4}{18}$ in each, astigmatism being probably imperfectly corrected. Fields, measured with perimeter, apparently exactly as before. Constant use of tinted glasses, avoidance of all close use of the eyes, and middle-day rest in recumbent position strictly enjoined.

July 18*th*.—Visited at home. Sight much stronger. Tn and $V = \frac{3}{6}$ nearly in each eye, with proper correction of astigmatism. The conditions of testing were not the same as in my own consulting room, but a considerable increase of acuity was certain. The refraction had altered considerably, the correction for distance now being

$$R\ \frac{0{\cdot}75\text{D}}{-2{\cdot}5\text{D cyl.}} \qquad L\ \frac{1{\cdot}5\text{D}}{-3{\cdot}0\text{D cyl.}}$$

With the addition of proper convexes the patient could read much better than before the operation; these glasses being supplied soon afterwards she and her friends declare that there is much improvement of sight as compared with her state previous to the operation.

It is stated by some authors that deep cupping of the optic discs having all the characteristics of the glaucoma cup may occur independently of an excess of tension. Such a case as the foregoing seems to me to justify the doubt whether this is true. Here there was cupping of extreme degree, and yet up to the very date of the operation the tension was found on several occasions to be strictly normal. Sir William Bowman noted an excess of tension at the very outset of the case, and not long afterwards found both discs excavated and the tension normal. Throughout the long period of twenty years there was, probably, an ever-present tendency to increase of tension during periods of nervous exhaustion, and disturbance of the vasomotor system to which the patient is peculiarly liable; the actual excess, however, was probably never of very great amount or of very long duration. Had this patient been the subject of a few isolated examinations only, the case might naturally have been cited as one in which glaucomatous cupping had occurred without excess of tension. No doubt the excavation of the disc in glaucoma is not a purely mechanical result of exalted pressure; it is, in part at least, an atrophic condition which, though primarily due to pressure, includes vascular changes and impaired nutrition in the substance of the disc, which require a long time for their full development, and which may probably progress even though all excess of pressure be removed.

The complete remissions of the raised tension, which occurred in this case up to the time of operation, indicated, I think, that the angle of the anterior chamber, though at times compressed, was nowhere obliterated by adhesion of the surfaces, such as very frequently occurs in the more acute forms of the disease.

The importance of rest and tranquillity, and the ill-effects which attend exhaustion, when glaucoma is imminent, were well exemplified in this instance.

The usually accepted doctrine that cases of advanced cupping with little excess of tension are unfavourable for operation has here, happily, proved erroneous.

A NOTE ON PERIMETRIC RECORDS.

By Priestley Smith.

An exact reproduction of a perimeter chart is, of course, the best method of publishing a record of the form of the visual field, and in many cases no other method is satisfactory. There are cases, however, in which a simple statement of the dimensions of the field in its principal meridians is sufficient. In describing a field without the use of a chart, some writers indicate the meridians by the words—Upper, Inner, Upper-inner, etc.; others by initial letters; others, again, by degrees of the circle. Apart from the confusion which arises from the want of a uniform nomenclature, it is difficult from such records to rapidly form a mental picture of the field in question, or to compare one record with another. I venture to suggest a plan which gives no difficulty to the printer, and which comes nearer to a graphic representation of the field than the verbal descriptions usually given. The following arrangement is a record of the two normal fields in their principal meridians, vertical and horizontal:—

		55			55	
Fields.	90	L	55	55	R	90
		65			65	

When it is desirable to record the intermediate meridians, viz., the upper-outer, the upper-inner, etc., 45° from the vertical and horizontal, this may be done by inserting the figures as here shown:—

	70	55	55	55	55	70
Fields.	90	L	55	55	R	90
	80	65	58	58	65	80

Records, on this system, of the contracted fields in a case of chronic glaucoma are given at page 264.

The following show central scotomata in a case of tobacco amblyopia:—

Fields. (Periphery normal)	8	7	8	4	4	10
Scotomata	18	L	8	4	R	18
	10	7	8	4	4	10

With these figures before the eyes, the right field opposite the right eye, the left opposite the left, the reader can easily project the dimensions in his imagination, and create mental pictures of fields such as actually existed for the patient. The method will, of course, be insufficient when the shape of the field is at all complicated; its use is only suggested where a diagram is superfluous.

ERNST FUCHS (Liége). Peripheral Atrophy of the Optic Nerves. *Von. Graefe's Archives, Vol.* 3, *p.* 177.

Fuchs has discovered by microscopical examination of the optic nerves of more than sixty persons of various ages, that, more or less, degeneration of the fibres immediately beneath the sheath of the nerve, and of those adjacent to the central vessels, is invariably present in persons of adult age.

With regard to the minute anatomy of the nerve, he points out a detail, not hitherto described and not to be found figured in any drawing, with the exception of one by Edmunds and Lawford (Trans. Ophth. Soc., Vol. III., p. 161). This is the almost invariable presence, near to the anterior extremity of the nerve, of fine septa lying parallel or rather concentric with the pial sheath, and separated from it only by a thin stratum of fibres; the thickness of this fibre-stratum varies from 0·03 to 0·06 mm. These peripheral septa are only to be found in sections of the anterior portion of the nerve; in some cases they reach forward as far as the lamina cribrosa, in others they end by blending with the pial sheath a little behind this point; backwards, they gradually diminish until they quite disappear at from 8 to 18 mm. behind the globe. It is in the thin stratum of nerve fibres which lies between this fine annular septum and the sheath of the nerve that atrophy invariably occurs. The atrophied stratum of fibres, taken as a whole, may be pictured as a tubular case enclosing, more or less completely, the healthy constituents of the nerve at its anterior extremity, the case being not an entire one, but perforated at many points by bundles of healthy fibres passing through it, and becoming less and less complete posteriorly where the atrophy disappears and only healthy fibres are present.

Similar atrophic changes are to be found at the centre of the nerve in those bundles which lie in immediate contact with the connective tissue accompanying the central vessels, and they may usually be traced backwards along this tract to the point at which the vessels emerge from the trunk of the nerve. The atrophy is less pronounced here than at the periphery, but is present, more or less, in every adult nerve. In both positions the atrophy becomes more marked with the advance of life, and reaches its maximum in the aged. It shows no tendency to spread beyond the regions indicated. The atrophy appears to be of the same kind as the grey atrophy described by Laber (Graefe's Archives, Vol. XIV., p. 164). Nucleated fat cells, such as are often found in the atrophied optic nerves in tabes, are not discoverable, and there is no trace of inflammatory changes.

In endeavouring to account for this normal degeneration, so to speak, Fuchs lays stress upon the fact that the atrophy is found only in those nerve bundles which lie in contact with the pial membrane, whether in the sheath or in the prolongation which accompanies the central vessels, and further, that its principal site corresponds closely in position and extent with the peripheral septa described above, being limited to the thin layer of fibres which lies between the sheath on the one side, and the peripheral septa on the other. It appears probable that when the blood vessels traversing these two layers of connective tissue become over-filled, the intervening nerve fibres are strongly compressed, and that with the frequent repetition of congestion they gradually suffer atrophy through pressure. This influence of the blood vessels is rendered all the more probable by the fact that the peripheral atrophy may often be traced a long way backwards in fibres lying close to a vessel. It is probable also that the lymph spaces, which exist everywhere between the nerve bundles and the septa, play some part in the production of the atrophy, either by compression or maceration of the fibres by the surrounding fluid. The lymph spaces are especially well developed beneath the pial sheath and around the central vessels.

Recent investigations have shown with the greatest probability that the fibres which form the outermost layer of the nerve at its anterior extremity supply the retina immediately around the optic disc; the functional consesequence, therefore, of the atrophy in question should be a gradual increase in the size of the "blind spot" with the advance of life. Whether such an increase can actually be demonstrated, further observations must decide.

The article is well illustrated by microscopic drawings.

LUDWIG MATTHIESSEN (Rostock). On the Law of Increase in the Indices of Refraction of the Crystalline Lens of Mammals and Fishes. *Von Graefe's Archiv. XXXI., 2, p. 31.*

The numerous measurements made of refractive indices of the different layers of the lens have led Matthiessen to the discovery of a simple law by which they appear to vary.

The gradual increase may be represented by a parabolic curve, the y of which is measured outwards from the centre of the lens along a line normal to its surface, and the x of which *equals* the relative refractive index of centre and surface *minus* the refractive index at any particular point divided by that of the surface.

Calling the refractive index of any point relatively to that of the surface μ, and that of the centre relatively to the surface index $\mu_1 = 1 + \zeta$, and b = length from centre of lens to surface, we have in the equation to a parabola referred to the vertex as origin $y^2 = 4ax$, $x = 1 + \zeta - \mu$. For the value of the parameter $4a$, we have when $\mu = 1$, $y = b$, therefore, $x = \zeta$, which gives the relation $b^2 = 4a\zeta$. and the equation may be written

$$\frac{y^2}{b^2} = \frac{1 + \zeta - \mu}{\zeta}$$

or

$$\mu = 1 + \zeta \frac{b^2 - y^2}{b^2}$$

Putting N for the absolute index at any point and N_1 for the index at the surface

$$N = N_1 \left(1 + \zeta \frac{b^2 - y^2}{b^2} \right)$$

Along two different lines from the centre we should have owing to homothetic arrangement in the lens round the centre

$$\frac{y'}{b'} = \frac{y''}{b''}$$

Matthiessen has found an extraordinary analogy to the index curve of the crystalline lens in that of cylinders or spheres of gelatine which have first been dried and then allowed to imbibe water for some weeks until the swelling has reached the axis or centre.

The indices of small pieces excised at regular intervals, determined by Abbe's refractometer was then compared with those calculated by the above formula. The agreement is fairly close as seen by the following table, one of the two given in the paper. The formula giving the calculated values was

$$N = 1{,}3744\left(1 + 0{,}00742\,\frac{b^2 - y^2}{b^2}\right)$$

y	N		Δ
m.m.	Determined.	Calculated.	
0	1·3846	1·3846	0
1	1·3844	1·3845	+1
2	1·3841	1·3844	+3
3	1·3838	1·3841	+3
4	1·3834	1·3838	+4
5	1·3831	1·3833	+2
6	1·3829	1·3827	−2
7	1·3821	1·3821	0
8	1·3807	1·3813	+6
9	1·3795	1·3804	+9
10	1·3786	1·3794	+8
11	1·3777	1·3783	+6
12	1·3768	1·3771	+3
13	1·3756	1·3758	+2
14	1·3744	1·3744	0

G. A. BERRY.

EDWARD JACKSON (Philadelphia). Alarming and Dangerous Doses of the Mydriatics. *Transacts. Med. Soc., Pennsylvania, for* 1884.

The author has carefully examined the literature of poisoning by atropia and allied substances, with the object of ascertaining at what point serious danger to life actually begins. He divides the recorded cases into two groups:—1. Those in which recovery occurred after the manifestation of very grave symptoms, or in which the amount of the drug used approached or exceeded the minimum fatal dose ; 2. Those which ended fatally.

The ordinary dose of atropia (atropina, B.P., 1885) is $\frac{1}{2}$ to $\frac{1}{3}$ milligramme ($\frac{1}{120}$ to $\frac{1}{60}$ grain). This is the amount usually given, hypodermically or by the stomach, to check sweating, or to correct or supplement the action of morphia. In larger doses than this the drug is apt to produce slight toxic symptoms—viz., disorder of vision, dryness of the throat, alteration of the pulse-rate, and inco-ordination of thought and motion, and hence, according to the author, the majority of practitioners would hold it to be improper or dangerous to give larger doses than those above stated to any person whose susceptibility had not been previously tested. But a careful examination of cases shows that the actual danger connected with the symptoms referred to has been much exaggerated.

Jackson lays down the following conclusions:— 1. For adults the minimum fatal dose of atropia is certainly not less than the minimum fatal dose of morphia ; 2. The minimum fatal dose for children of two years of age and upwards is not less than for adults ; 3. There is every probability that the same is true of the other mydriatic alkaloids.

He urges that delirium, unnatural voice, and irregular locomotion indicate no more danger when produced by a mydriatic than when produced by alcohol ; and that while such toxic symptoms should of course be avoided when a small dose of the drug meets the requirements of the case, they should not stand in the way of its freer use when a more powerful effect is desirable, the fact being that there is an exceptionally wide interval between the alarming and the fatal dose.

In connection with this same subject we note that another writer, in a recently published thesis (*vide* Centralbl. f. Augenheilkunde, Aug., 1885, p. 253), takes the very position against which Jackson protests ; and having collated a series of cases in which the medicinal use of atropine had produced temporary symptoms of so-called poisoning, advocates the routine use of extremely weak solutions for ophthalmic purposes, and that when stronger preparations are employed they should be given to patients in quantities sufficient for one day only—a practice which, if carried out, would certainly do far more mischief than it would prevent.

Hirschberg, in a foot-note, states that he has never seen a case of atropine poisoning from the use of collyria. We ourselves have known of only one serious case: the practitioner, not an oculist, having witnessed the power of atropine to banish a recent strabismus in a young child, attempted a similar cure in the case of a confirmed squint in an adult: failing with the ordinary solution, he increased both the dose and the frequency, until the onset of sharp toxic symptoms induced him to abandon the refractory squint and send for a physician.

M. BURCHARDT. Pathological Anatomy of Chalazion.

Centralbl. f. Augenheilk. Aug., 1884, *p.* 229.

The author found the following microscopical appearances in six successive examples of chalazion examined after removal by operation: A delicate granulation tissue infiltrated with pus, and in the peripheral portions of the tumour interstitial tissue with capillaries. Cells mostly arranged in rows, commonly circular, and from two to three times the diameter of a red blood corpuscle. A vast number of the individual cells contain round their nuclei minute granules, which exhibit more or less lively movements, and are manifestly situated within the cells. The movements resemble those observed in the salivary corpuscles. Granules are found also external to the cells. In one case he also found very delicate threads in the tissue, best marked in the periphery of the chalazion, which bore a strong resemblance to leptothrix buccalis, but some of them exhibited bends, and possessed gonoidia. Burchardt observed this movement of minute granules in every case of chalazion in which he looked for it, and he believes these bodies to be the active agents in the production of a chalazion, and considers that this theory finds support in the fact that chalazia often infest individuals for a certain time, and then completely disappear. He has proved that foreign organisms can make their way into such positions by the discovery of an acarus folliculorum in the interior of one of the chalazia examined by him.

W. R. Gowers (London). Lectures on the Diagnosis of Diseases of the Brain. *London: J. & A. Churchill*, 1885.

These lectures are meant to form a companion volume to the "Diagnosis of Diseases of the Spinal Cord" by the same author. They were originally delivered at University College Hospital, and have been left, as the preface informs us, very much in the form in which they were delivered.

The first three lectures are occupied with an account of the medical anatomy of the brain, which is undoubtedly the most clear, succinct and accurate in our language. Not the least satisfactory part of the account is that devoted to the visual path and centres. There are several admirable diagrams in this part of the work, and that given on p. 19 showing the relation of the fields of vision, the retinæ, and the optic tracts will, if we mistake not, become classical as a telling and comprehensive representation of the facts. Gowers definitely rejects Charcot's complementary decussation of optic fibres in the anterior corpora quadrigemina. This he does, we presume, on the ground of undoubted cases of hemianopia caused by lesions in the neighbourhood of the posterior part of the internal capsule, and in the posterior part of the occipital lobe. He does not attempt fully to explain the cases of crossed amblyopia in hysteria and in organic cerebral disease, on which Charcot founded his supposition, but uses these in proof of a high cortical centre of vision in each hemisphere, in which the whole of the opposite field is represented. This higher visual centre he believes, with Ferrier, to be located in or near the angular gyrus. The proof that this area constitutes a higher visual centre than what he terms the half-vision centre in the occipital lobe can scarcely be regarded as convincing.

With reference to the course of optic fibres in the internal capsule uninterrupted by grey matter, it is well to remember that no case has yet been recorded so far as we are aware, in which a lesion undoubtedly limited to the internal capsule and not affecting the neighbouring optic thalamus, has produced hemianopia. On the other hand several cases have been recorded in which limited lesion of the pulvinar has resulted in hemianopia.

The anatomy of the brain and its vascular supply having been discussed, nine lectures are devoted to an account of the motor, sensory, and general symptoms of cerebral disease, and the last six lectures discuss the evidence afforded by these symptoms, first as to the seat, and second as to the nature of the lesion. It goes without saying that Dr. Gowers' account of the symptoms of cerebral disease is an admirable one both as to fact and form. Attention rarely flags in reading these lectures, and we may safely place Dr. Gowers among our masters of scientific style. Numerous cautions, both in observation and in interpretation, are scattered throughout the work, which can have been suggested only by long and carefully utilised clinical experience.

In certain points Gowers goes definitely against our traditional beliefs. For example, he gives reasons for believing that the fifth cranial is the sole nerve of taste, and also for excluding the seventh from any share in the innervation of the palate muscles. His account of the visual symptoms of cerebral disease will well repay careful perusal by ophthalmic surgeons. The least satisfactory part of the work is that where ophthalmic surgeons will least want its assistance, namely, the discussion of the paralyses of the extrinsic and intrinsic ocular muscles. His account of the defects of movement and of the diplopia resulting is extremely, and it seems to us, unnecessarily complex. Granting that the action of each extrinsic muscle is known, we may readily infer the defect caused by the absence of this single force, and the displacement of the false image is easily recollected by the fact that it is invariably displaced in the direction in which the paralysed muscle *would* act. This last statement applies both to the lateral and vertical displacement of the image; for example, in paralysis of the superior oblique the false image is displaced downward and outward, and is inclined so as to be nearer the true image above than below.

On p. 99, in the account of laryngeal palsies, a double slip occurs, the abductor muscle being termed crico-thyroid in place of crico-arytenoid, and being made to arise from the thyroid in place of the cricoid cartilage. In his lecture on "Affections of Speech" Gowers brushes away the excrescences of nomenclature and false refinement that have grown up in this difficult subject, thereby contributing largely to the intelligent observation of aphasic cases, and the future elucidation of the physiology of speech.

The last six lectures on the diagnosis from symptoms of the seat and nature of cerebral lesions are undoubtedly the most valuable part of the work, as also the most difficult, and we feel sure that physicians and surgeons alike will be grateful for this outcome of Dr. Gowers' broad and ripe experience. To attempt any detailed review of these lectures is simply impossible, as each is a tissue of closely reasoned inferences. We need only say that here, as elsewhere, the author's admirable style and consistent terminology make it comparatively easy to follow his train of argument. It is a venial fault, if fault it is, that in this matter of terminology Dr. Gowers is occasionally somewhat finical. Is there really any strong reason for objecting to the terms "localise" and "localisation"? Even Dr. Gowers himself drops into the convenient usage. And again, is the use of "paresis" in the sense of partial paralysis very objectionable? It has not much to commend it, more especially as the word is usually pronounced, but there seems no very strong reason for condemning it. We cannot say as much, however, for the ambiguous term "hemiopia" used by Dr. Gowers to express *defect* of one-half of *both* fields of vision. "Hemianopia" or "hemianopsia," with or without the qualifications homonymous, nasal, temporal, &c., is surely both more correct and more in accordance with the analogy of similar words.

AMERICAN OPHTHALMOLOGICAL SOCIETY.

TWENTY-FIRST ANNUAL SESSION,

HELD AT NEW LONDON, CONN., JULY 15 AND 16, 1885.

President—DR. WILLIAM F. NORRIS, of Philadelphia.

[From the *New York Medical Journal.*]

Operation for the Removal of a Dislocated Crystalline Lens.—Dr. C. R. Agnew (New York) related the steps of the operation as follows:—The pupil was dilated, and the patient was then etherized and cocaine was applied. The eye was secured with fixation forceps. An instrument resembling a two-pronged fork, which was termed a bident, was introduced into the vitreous chamber behind the dislocated lens, pressing it forward. Section was then made and the lens removed. The eye was dressed with absorbent cotton and a black silk bandage. Antiseptic solutions were used, and a four per cent. solution of cocaine was applied twice a day. The eye recovered without any unpleasant symptoms. The speaker did not claim that all dislocated lenses should be removed, but this instrument facilitated the operation when it was required.

Extraction of a Dislocated Lens.—Dr. David Webster (New York) reported the case of a patient who received a blow on the right eye. This was immediately followed by loss of sight. Examination showed that the lens was dislocated. No treatment was recommended at that time. Some months later, pain suddenly appeared in the injured eye. The lens was found to be cataractous and incarcerated in the pupil. Cocaine was applied, but did not relieve the pain. Atropine relieved the pain. Later the lens became loose and was found in the vitreous. The tension was normal. It was decided to remove the lens. The bident was passed back of the lens, pressing it forward. The incision in the cornea was then made and the lens removed with a spoon. The eye was dressed with absorbent cotton, and recovered without complication.

Dr. H. Knapp thought that in these cases there was not much difficulty in removing the lens, which could often be accomplished with the loss of very little vitreous, but the danger came in afterward from inflammatory complications; and where the sight was lost he thought it better to enucleate the eye at once and thus lessen the dangers of inflammation.

Dr. Williams (Cincinnati) agreed with Dr. Knapp that enucleation was the best procedure.

Dr. Agnew thought that the bident might also be useful in the removal of foreign bodies from the interior of the eye. He did not acquiesce in the view that enucleation was a simple operation. He regarded it as a serious mutilation.

Dr. C. H. Williams (Boston) thought that there was another alternative than those mentioned, and that was evisceration of the eye, and closure of the anterior opening with sutures. He thought this better than enucleation, as it gave a better stump for the artificial eye.

Extraction of the Lens in its Capsule.—Dr. D. B. St. John Roosa (New York) said that for the past three years he had been in the habit of removing the lens in its capsule, in a large proportion of cases without iridectomy. The section was made as usual, but large. After puncture and counter-puncture were made, the knife was turned on its back so that it rested on the iris. It was then moved up and down two or three times until the lens was seen to move ; then the section was completed, and the lens could usually be removed without loss of vitreous. Sometimes after the operation the iris was rolled under, but in many cases the pupil was circular. Dr. Roosa had performed the operation between thirty and forty times, and was satisfied with his success.

Sub-conjunctival Luxation of the Lens.—Dr. George C. Harlan (Philadelphia) reported two cases. In the first case no operation was recommended, as vision was good. In the second case the lens was removed. In those exceptional cases in which vision remained, the operator should think twice before resorting to removal.

Dislocation of the Lens under Tenon's Capsule.—Dr. O. F. Wadsworth (Boston) reported a case in which the eye had been injured two weeks before the patient came under observation. There was loss of sight, pain about the eye and irritation of the other eye, the cornea was hazy, and there was blood in the anterior chamber. The eye was enucleated, and it was found that the lens was beneath Tenon's capsule, and that it was held in this position by inflammatory tissue.

The Treatment of Purulent Conjunctivitis.—Dr. J. A. Andrews (New York) read a paper on this subject, in which he said that the treatment was based upon the belief that the contagious element was of the micrococcus variety. He related a case in which he had secured an inoculation of the seventh generation of a pure cultivation of a gonococcus. This was the first case inoculated with the gonococcus. He exhibited an instrument which he had devised to wash out the conjunctival *cul-de-sac.* It consisted of an eye speculum with hollow arms through which fluid might be passed. He had found bichloride of-mercury solution (1 to 10,000) serviceable, but apt to irritate. A six per cent. solution of boric acid was also found efficient. A two per cent. solution of carbolic acid was useful, as it inhibited the movements of the white corpuscles. Irrigation should be maintained for ten minutes in order to remove all secretion. Nitrate of silver solution (two to twelve per cent.) was then used, and an antiseptic dressing was next applied. This consisted of vaseline and boric acid or carbolic acid; but he laid especial stress upon the importance of maintaining irrigation of the conjunctiva by means of the instrument referred to.

Abscess of both Frontal Sinuses.—Dr. Charles S. Bull (New York) related a case in which the patient had been hit on the forehead fourteen years previously with a piece of wood. This produced a fracture of both nasal bones and deviation of the septum. In seven weeks the wound had closed. Ten years after the accident a swelling was noted at the upper inner angle of the right orbit which could be made to disappear by pressure. There was complete ptosis. An incision was made into the swelling just beneath the orbital margin and a large quantity of pus escaped (two or three ounces). The cavity was washed with a five per cent. solution of carbolic acid. The septum between the two frontal sinuses was absorbed and both sinuses were converted into large cavities. The entire ethmoid bone was an immense cavity, the bony suture being absorbed. A number of osteophites were removed and a drainage tube was introduced. The patient was discharged six weeks after the operation and recovered completely. The ptosis disappeared and the eye was restored to the normal plane.

Dr. Knapp recommended the substitution of a silver tube for the rubber drainage tube usually employed.

Bony Tumour of the Orbit.—Dr. B. E. Fryer (Kansas City, Mo.) related the case of a boy six years of age who came under observation in April, 1885. There was swelling of the left orbit, which included the whole line of the superciliary ridge. It was quite hard. The boy had been struck with a piece of wood. It was decided to remove the tumour. This was done, and, on examination, it proved to be a cyst, within which was a small piece of wood. This was enclosed in bone on all sides. The edges of the wound were brought together and healing resulted without complication.

Sarcoma of the Orbit in a Child.—Dr. W. H. Carmalt (New Haven, Conn.) reported the case of a child of ten years of age from whom he removed a small growth from the upper lid. Six weeks later the growth had returned. An exploratory operation was done, and it was found that the growth extended into the orbit, and that it was impossible to remove it entirely. It was therefore decided not to complete the operation. The child had since died, and the tumour proved to be a rapidly growing sarcoma. He thought that, if in young children the tumour appeared to be quickly recurrent and not easily isolated, no operative interference should be attempted.

Dr. Kipp (Newark) thought that in many cases these tumours of the orbit were not primary, but secondary, and that the primary tumour might be in such a position as not to attract attention.

Dr. Harlan (Philadelphia) reported several instances of inflammatory exudations in the orbit simulating tumours, and illustrating the importance of exercising great care in diagnosis.

Some of the Results obtained in the Compilation of 1,000 *Cases of Refraction.*—Dr. E. E. Holt (Portland, Me.) had been in the habit of recording all the measurements connected with the prescribing of glasses. As a result, he had found, in 1,000 cases thus recorded, the average distance between the centres of the pupils of the human eye to be about 60 mm. The average of other measurements was given, and the importance of the physician determining and designating them, and then seeing that they were carried out, was dwelt upon.

Rapidly Progressive Myopia checked by Section of the External Rectus.—Dr. Harlan related the case of a boy of sixteen in whom myopia was progressing rapidly. The external rectus was divided seven years ago. The internal rectus was also exercised by the use of prisms. Since then there has been no increase of the myopia.

Progressive Astigmatism.—Dr. Samuel Theobald (Baltimore) related three cases of this affection.

Hypermetropic Refraction passing into Myopic Refraction.—Dr. S. D. Risley (Philadelphia) had on previous occasions called attention to five cases of a similar kind, and the object of his paper was simply to report six additional cases seen within the past year.

The Demonstration of Refraction and Accommodation.—An apparatus for this purpose was exhibited by Dr. Lucien Howe (Buffalo, N.Y.) It consisted of two bands of thin metal bent in such a manner as to represent the outlines of a double convex lens, and passing through it were two jointed rods representing the rays of light ordinarily figured as passing through such a lens and joining at its focus. The flexible bands were attached to each other above and below. so that, by approaching or separating the sides, they could be made to show less or greater convexity. The rods representing the rays of light were jointed near the centre in such a way that while the two halves could be placed in such a direction as to show the light as entering parallel to the axis of the lens, the other two portions could be bent to a point to show the convergence of rays at the focus. By alteration in the position of these rods, and also in the forms of the bands representing the lens, all the different variations of the laws of refraction and the changes in accommodation could be demonstrated to a class.

Two Cases of Unilateral Temporal Hemianopsia.—Dr. C. S. Bull read a paper with this title.*

Penetration of the Eyeball with Scissors in the Operation for Strabismus.—Dr. H. Derby (Boston) reported two cases, the first of which was that of a young man on whom an operation for strabismus had been attempted. The surgeon inadvertently picked up a pair of sharp-pointed scissors. The point of the scissors suddenly penetrated the eyeball, and a portion of vitreous, equal in size to a cherry-stone, escaped. The operation was abandoned, and Dr. Derby was called to see the case. The eye was bandaged and the patient put to bed. Several attacks of inflammation supervened, but the patient was discharged on the forty-first day with $V = \frac{7}{10}$.

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* For full record of cases with charts see *N. Y. Med. Jour.*, Aug. 8th, 1885.

In the second case the scissors also entered the sclerotic, but, after a somewhat tedious convalescence, the wound was found closed on the twenty-first day with vision as good as before the operation.

Dr. Knapp stated that he had done three thousand squint operations, and in three cases he had punctured the sclerotic. He, however, completed the division of the muscle, and the patients recovered as readily as from an uncomplicated operation.

Dr. Mittendorf thought that in case the accident happened the division of the muscle should be completed.

Dr. E. Williams reported a case in which he had punctured the eye. The patient recovered without difficulty.

Strabismus; its Correction when Excessive and in High Degrees of Amblyopia.—Dr. E. E. Holt read a paper with this title, in which he said that he had employed advancement of the weakened, attenuated muscle in connection with tenotomy in certain cases of squint, and after tenotomy alone had failed to correct the deviation. He also exhibited an apparatus that he had devised for showing the associated and accommodative movements of the eyes and the effects of tenotomy and advancement of the muscle in correcting squint.

Dr. Kipp had at one time employed advancement, but he had given it up because it was difficult to graduate the result.

The Treatment of Strabismus Internus.—Dr. W. W. Seely, of Cincinnati, read a paper with this title, and from which he made the following deductions: 1.—That, with our present knowledge, routine operative interference is wrong. 2.—That to thoroughly correct the deviation in young children by operative interference is extremely liable to subject them in after life to insufficiency or external squint. 3.—That a later period of life, if anything, favours better results from operative interference.

Dr. Knapp considered advancement a dangerous operation. He had always been able to correct the deviation by two or three tenotomies, and, if necessary, by stitching the eye to the commissure.

Dr. Theobald indorsed Dr. Knapp's views in reference to advancement. He was surprised at the conclusions of Dr. Seely. Squint operations in his hands had been very satisfactory. If postponed, they were likely to prove unsatisfactory on account of the amblyopia which was liable to develop.

Dr. O. F. Wadsworth had convinced himself that amblyopia from squint did not occur. The ability of the patient to use the vision which he had seemed to be lost by a continuance of the squint, but it might be recovered by practice.

Ectropion of Both Lids; Blepharoplasty by the Italian Method.—Dr. R. H. Derby (New York) reported a case in which the displacement of the lids was the result of cicatricial tissue from a severe and extensive burn of the face. The lids were loosened from their attachments, and the new lids were formed from flaps raised from the arm. The arm was bound to the head with water-glass plaster, and the pedicle was not divided until union had taken place.

Plastic Operations without Pedicles.—Dr. B. Joy Jeffries (Boston) read a paper with this title, in which he suggested the use of the prepuce from the circumcision of Jewish children for operations about the eyes. He also suggested that in plastic operations the desired result might be obtained without the use of a flap by employing carbolized-oil dressings to retard healing.

Two Cases of Congenital Paresis of the External Rectus were reported by Dr. Harlan, who also exhibited and described Borek's sphero-cylindrical lenses.

The Removal of a Piece of Steel from the Lens with the Electro-Magnet.—Dr. J. L. Minor (New York) reported a case in which the shank of a strabismus-hook was attached to an electro-magnet, thus making it a magnet. The extremity of the hook was then carried into the lens, and the piece of steel at once attached itself to it and was removed. Thirteen days later the eye had recovered from the operation. The lens had not yet been removed.

Removal of an Epithelioma of the Eyelid by Applications of Benzol and Calomel.—Dr. A. Mathewson (Brooklyn) reported the case of O. D., a labourer, fifty years of age, who was seen October 3, 1881, with a tumour on the right lower lid. This first appeared as a warty growth three years previously. Of late it had been rapidly growing, and presented a raw granulation surface. Careful examination by an expert showed it to be undoubted epithelioma. It was treated by frequent dustings of calomel, after brushing the surface with benzol. The tumour entirely disappeared until a few months ago, when a granular spot appeared at one edge of the site of the former growth. This disappeared under a renewal of the same treatment.

Lipomatous Ptosis.—Dr. H. S. Schell (Philadelphia) reported four cases of ptosis from excessive accumulation of fat in the upper lids. The excessive fat was removed through a horizontal incision. The smallest amount taken away was thirty-five grains, the largest seventy-one grains. The levator regained power in from one to four weeks. In one case it was necessary to repeat the operation.

The Pulsating Variations of Intra-ocular Tension as measured by the Manometer.—Dr. Lucien Howe (Buffalo, N.Y.) exhibited the double manometer described by Grasser and Holzke. In this there was an imperfection in the trocar which was rather complicated and liable to get out of order. An improvement was accordingly suggested in having a stopcock attached to a needle of the hypodermic syringe, and this the writer found to serve the purpose much better than any other. The animal best adapted to this class of experiments was the cat, on account of the deep anterior chamber.

In the earlier experiments with the manometer it was noticed that the intra-ocular tension varied with the heart's action. In addition to this, the writer called attention to the fact that these variations in the pressure as indicated by the manometer corresponded to pulsations which could be seen with the ophthalmoscope in the vessels in the interior of the animal's eye. In other words, if the same thing held in the human subject, we must infer that, when pulsation was seen in the interior of the eye, there was also a variation of intra-ocular tension, although not enough to be detected by the touch or by an ordinary instrument. This connection between pulsation and pressure was a demonstration of the cause of venous pulse in the eye as explained by Donders. It was also observed that after the introduction of the needle there was at first considerable pulsation, but after a short time this ceased, the eye evidently adjusting itself to the unusual condition. The experiments referred to were made in the laboratory of Prof. Zunzt, of Berlin.

The Extraction of Chips of Iron from the Interior of the Eye.— Dr. H. Knapp reported nine successive cases in which the electro-magnet was used for this purpose.

These cases were operated on during the past three years and a half. In two the chip of iron was located in the iris, in one for two days, causing inflammation, and in the other for seventeen years, remaining quiet until recently. Both were successfully removed without injury to the eye.

In the seven remaining cases the foreign body was in the vitreous, had produced cataract, and could not be seen. In three cases the attempt to extract them with the magnet failed, and the eyes had to be enucleated. In four cases the chips of iron were brought forth at the first, second, or third introduction of the tip of the magnet. In all these four cases the recovery was uninterrupted. All four were still cataractous. In two the form, size, and tension of the globe were not changed, and the perception of light was good over the whole field. In the two others the globe was slightly smaller and softer and the field of vision defective, corresponding to the wound made for the extraction of the foreign body. There was no irritation in any of the four eyes as long as they were under observation.

The Actual Cautery in Destructive Corneal Processes.— Dr. Knapp cited a number of cases in which its use had been of service, and he considered it a valuable measure.

Pneumophthalmos, or Air in the Vitreous.—Dr. W. F. Mittendorf (New York) reported two cases, the first of which was that of a young blacksmith who was wounded by a piece of iron penetrating the sclera and lodging in the vitreous. The foreign body, surrounded by a clot of blood, was found at the bottom of the eye. Behind the lens and a little above it, three air-bubbles were seen by means of the ophthalmoscope. These appeared to be of the size of a small pea, the smallest about as large as a rape-seed. They closely resembled the air-bubble as seen under the microscope, their centres being bright and the outlines well defined, and surrounded by a sharp, black border.

Their recognition was not difficult. The foreign body could not be removed with the magnet, and it was decided to allow it to remain. The eye was carefully bandaged, and the day following it was found that the air-bubbles had united and were located at the posterior pole of the lens, the patient having remained quietly on his back some time before the examination. While he was in the upright position the air began to rise slowly until it reached the upper part of the vitreous chamber. During this trip the bubble looked oval and decidedly pointed at its lower portion, resembling oil globules as they are seen ascending in water. Forty-eight hours after the accident every trace of the air bubbles had disappeared.

The second case was the result of a drilling accident. Quite a large piece of stone or iron had perforated the sclera at the lower and outer part of the eye. In the semi-transparent vitreous an air-bubble of the size of a hemp-seed could be seen distinctly.

In order to determine the exact appearance of air in the vitreous, the writer experimented upon rabbits' eyes. Four of them had air introduced into the vitreous humour by means of a hypodermic syringe, and four were subjected to the introduction of oil, also by means of the hypodermic syringe. Nearly all these experiments were successful. The difference between the air and the oil-bubble was so marked that they could be readily diagnosticated by means of the ophthalmoscope. The latter were more highly refractive, heavier in appearance, and the contour decidedly darker than the air-bubbles, which were entirely colourless.

The conclusions reached by the author were as follows: 1. The entrance of air into the vitreous body could occur only after a part of the contents of the vitreous chamber had escaped. 2. It was favoured by the entrance of a foreign body, which made a large, gaping, irregular wound of the sclera. 3. In order to allow air to enter the vitreous, this must either be quite fluid or its anatomical arrangement must have been disturbed by the entrance of a foreign body, or the air must have been attached to the foreign body and carried with it into the eye. 4. The air in the vitreous humour appeared like an air-bubble as seen under the microscope; it was more or less round, highly refractive in the centre, and had a sharply defined black outline. 5. Oil globules in the vitreous presented a similar appearance, but they looked heavier and were not perfectly colourless, and their outlines were darker; they were also more glittering in the centre. 6. Air-bubbles would be absorbed completely within two or three days; their presence was not a source of great danger to the eye. Oil globules lasted longer, but they were likewise non-irritating.

A Case of Tubercle of the Iris.—Dr. Myles Standish (Boston) reported the case of a girl, fourteen years of age, who came under his observation with an eye trouble which had existed four weeks. There had not been much pain or photophobia. No specific history could be elicited. During the past winter the patient had suffered with intense epigrastic pain and ascites. The iris was attached by its pupillary margin to the capsule of the lens, and presented near its ciliary border a growth 2 mm. in diameter, pink in colour, with small vessels on its surface. In the course of a month the growth had doubled its size, the conjunctiva and iris remaining perfectly clear. Other growths made their appearance, and, after consultation with Dr. Wadsworth, the eye was removed at the Massachusetts General Hospital. Examination after enucleation showed the vitreous, retina, and choroid to be normal. The lens was somewhat opaque. The iris was very adherent to the capsule of the lens along its pupillary border, and also beneath the entire area of the principal growth. The largest mass sprang from the surface of the iris near its ciliary border, and at its base was 2·5 mm. in diameter and 2 mm. in height. At the top its diameter was 4 mm. This was apparently due to the pressure of the growth against the cornea. There were three other growths, but none of them involved the ciliary body, or even the ciliary border of the iris. The microscopical examination showed the presence of giant cells and of tubercle bacilli.

Dr. Knapp had seen growths presenting exactly the same appearance which had disappeared under treatment with mercury, even where there was no evidence of syphilis. He had never felt warranted in making the diagnosis of tubercle in such cases, although the presence of the tubercle bacilli in this case would seem to confirm the diagnosis.

A Case of Congenital Coloboma of the Iris, Choroid, &c., was reported by Dr. C. J. Kipp. The patient was a woman, sixty-nine years of age. She was first seen four years ago. There were at that time no inflammatory symptoms, but a small triangular coloboma of the iris was found exactly in the vertical meridian. The tension was above normal. The patient had never seen with this eye, but it had never given pain. Four years later the patient was again seen, and the eye presented the signs of inflammatory glaucoma. The pain had prevented sleep for many weeks. The eye was enucleated and healed promptly. There was also found a large ectasia of the sclerotic. and over this the choroid and retina were wanting. The ectasia extended close to the optic papule. There was also a deep, kettle-shaped excavation of the optic nerve.

Coloboma of the Choroid on the Temporal Side.—Dr. S. D. Risley (Philadelphia) reported the case of a young physician who consulted him for asthenopia. There was a considerable degree of myopia in the left eye. In the right eye vision was much diminished. The ophthalmoscope showed a large hiatus in the choroid on the temporal side, the depth of which was 3 D. There had been no pain. The speaker thought that these cases were comparatively rare.

Gray Degeneration of the Optic Nerve, with Abnormal Patella Tendon Reflex.—Dr. William F. Norris made an elaborate review of the literature of the subject, and gave the results of his observations in cases in which the patella tendon reflex was increased or diminished. He described three cases of gray degeneration associated with tabes dorsalis which had come under his observation. While he did not hold that this symptom indicated beginning tabes dorsalis, yet it was a danger signal calling for rest of the brain and cord, with attention to improvement of the general condition.

A Case of Double Optic Neuritis and Ophthalmoplegia from Lead Poisoning complicated with Typhoid Fever.—Dr. O. F. Wadsworth reported the case of a boy nine years of age who had suffered from obscure febrile symptoms for several weeks, and movements of the left eye had been observed to be imperfect. When first seen by Dr. Wadsworth there was pronounced optic neuritis in both eyes. The rest of the fundus was normal. Vision was much diminished. No lateral movements of the left eye could be made, and movement downward was impaired. The outward movement of the right eye was defective. The probable diagnosis was tumour in the region of the pons.

The movements of the eyes became still more impaired and vision sank. The boy developed distinct symptoms of typhoid fever. The spleen and liver were both enlarged. Lead was found in the urine, and the diagnosis of tumour was then abandoned. The treatment was with iodide of potassium. The general condition gradually improved ; the neuritis passed into atrophy, leaving too little vision to count fingers. The movements of the eyes were completely restored, and the lead disappeared from the urine. The cause of the lead poisoning was found to be the presence of a piece of lead pipe in the cistern from which the drinking water was obtained.

Olive Oil as a Menstruum for Dissolving Cocaine for Application to the Eye.—Dr. Joseph A. Andrews said that the plan of dissolving cocaine in oil seemed to insure a longer contact of the remedy, and a smaller quantity was required to effect anæsthesia—two qualities of special advantage in operations on the eye. Neither the salts of cocaine nor those of atropine were soluble in olive oil ; but both alkaloids dissolved readily in the menstruum without the addition of an acid, it being only necessary to expose the solution for a few minutes to a gentle heat in a water bath.

Enucleation of the Eye for Glaucoma precipitating Glaucoma in the other Eye.—Dr. David Webster reported a case, the patient being a man of fifty-four, the subject of glaucoma absolutum. He complained of periodical obscurations of vision in the good eye, and there was no limitation of the visual field. As he was of dissipated habits, he was advised to live properly. A week or two later he returned, stating that he had had a worse attack. There was detected an excavation of the nerve in the good eye. The glaucomatous eye was now removed. Two days later acute glaucoma appeared. An iridectomy was performed, and he recovered in a week or two, with no cupping of the disc and no limitation of the field.

Quinine Amaurosis.—Dr. E. Williams reported two cases. In the first case a man took about one ounce in the course of four days. This produced total blindness and deafness, but in six weeks he could see as well as ever. The hearing had never completely returned, although the quinine was taken eight years ago. The field of vision was concentrically contracted in both eyes. The optic discs were very white, the calibre of the arteries and veins was reduced, and the smaller capillaries could not be seen.

The second case was that of a boy of fourteen, who had received large doses of quinine, the exact amount not being known. He was totally blind for four days. When examined, the sight was much diminished, the atrophy of the optic discs was extreme, and there was great contraction of the field of vision.

A Means of Measuring the Amount of Anæsthesia from Cocaine.—Dr. Lucien Howe exhibited the drawing of a kymograph, which he had used for this purpose. The use of the instrument was based on the fact that irritation of a sensory nerve was followed by a rise of blood-pressure. The instrument was connected with an artery, and the conjunctiva was irritated. Cocaine might then be applied, and the results on the blood-pressure compared.

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FRAGMENT OF GLASS IN EYE FOR OVER TEN MONTHS WITHOUT IRRITATIVE SYMPTOMS.

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Although several cases of fragments of glass remaining in the eye for considerable periods without causing irritation have been placed on record by Knapp and others, the following case is perhaps worthy of publication, from the fact of the foreign body having escaped detection during several very prolonged and careful examinations, and the ultimate fortunate result.

On the evening of August 4th, 1884, during a lecture on chemistry in the school-house of Tokomairiro, a retort burst with great violence, destroying one eye of the experimenter; the fragments of glass, flying in all directions, also wounding fourteen other persons more or less severely about the head and face. The subject of this paper, a boy of about 12 years of age, who was seated about 14 feet from the retort at the time of the explosion, received a cut on the left eyebrow, a little outside the cornea; a second cut on the cheek below the eye, a little inside the cornea; and a graze on the edge of the upper lid, in a line between the two larger injuries. Immediately below the graze on the edge of the lid was a vertical cut in the cornea, about 3 millimetres in length; the lens was also injured. While Dr. Reid, of Tokomairiro, was attending to the other sufferers, the boy complained much of having something in his eye, and very positively and distinctly stated that he rubbed something out while waiting, the foreign body being followed by a gush of scalding water ; at the same time he experienced a sharp pain, followed by relief of the sensation of having a foreign body there. This statement was borne out by his father, who was with him at the time.

Dr. Reid treated him with atropine and cold applications, and on the 12th of August sent him in to me, when I obtained the foregoing history, and found the eye in the following condition :—The pupil was widely dilated ; the iris was uninjured and pressed against the cornea by the enormously swollen opaque lens ; the cornea showed a vertical cut about 3 mm. long, rather above the centre of the pupillary area ; the edges of this cut showed considerable infiltration as though they had been a good deal bruised. The globe was uniformly tender on pressure, and the tension was more than + 1. The scars of the wounds on the eyebrow and cheek were plainly visible, the mark of the graze could only with difficulty be detected on the edge of the lid. No sign of a foreign body could be seen in the swollen lens. V was only perception of light, but projection of light was good in all directions.

The theory offered by the parents to account for the wounds was that a piece of glass about 2 inches long had inflicted the wounds above and below the eye, and that a projecting point had grazed the lid and penetrated the globe, but that it had been stopped by the eyebrow and cheek from going farther. I explained to them that if there were any fragment of glass in the lens I would endeavour to remove it, but that if it were deeper I should probably have to remove the globe, though from the distance at which the boy was sitting I thought it unlikely that any small fragment would penetrate deeply.

On the 14th, Dr. Reid administered chloroform, and I removed the lens by Macnamara's operation, and searched carefully with a spatula for a foreign body without finding any. The result of the search was the almost complete removal of the lens, and next day V was fingers at 1·5 metre.

On the 22nd, the eye was quiet, there was no pain or tenderness, V = fingers at 2 metres.

On the 25th. V was fingers at 2·5 metres, and only a little capsule remained, with a small amount of cortex behind the iris all round. The pupillary area was clear and bright to ophthalmoscopic examination through a large hole in the capsule, which had curled upwards and inwards out of the line of vision. On September 6th, V = $\frac{6}{12}$ most letters with + 11 D, and Jaeger 1 with + 15 D. The eye was perfectly quiet and free from pain or tenderness, and very careful examination did not detect any foreign body; the fundus was normal.

On June 27th, 1885, the boy returned with the eye much inflamed. He had been suffering from severe pain in the head for a fortnight previously, and from great intolerance of light. The iris was very irritable, and the pupil slightly oval downwards ; the lower outer portion of the cornea was very hazy, and lying on the floor of the anterior chamber was a fragment of glass V = percep. of light. The next day the fragment was in the same position, but during the administration of chloroform the child retched and displaced it somewhat upwards and outwards. Having made an incision below with a Graefe's knife, I endeavoured to remove the glass with an iris forceps, but after several attempts to disentangle it from the iris I delivered it with a vectis.

The fragment was a flake of glass almost square, with its longest edge about 2·5 mm. and about 1 mm. in greatest thickness. The eye rapidly cleared after the operation, and in a fortnight V was fingers at 5 metres with + 11 D, and on August 8th, V = $\frac{6}{60}$ with + 11 D, cornea still clearing, pupil still slightly oval downwards.

The glass must have been embedded in the cortex in the remains of the capsule above and inside the pupil, and when freed by the absorption of its surrounding cushion have been thrown forward by some lucky jerk through the pupil. Had it fallen behind the iris on the ciliary body the eye would have been lost. How it escaped the spatula in the first operation I do not know, but the good recovery and the perfect condition of the eye for over nine months, till it changed its position, afford valuable hints as to caution in prognosis in all cases of suspected glass in the globe. The vision of the right eye remained $\frac{6}{6}$ throughout.

THROMBOSIS OF RETINAL ARTERY OCCURRING DURING CONVALESCENCE FROM SCARLATINA.

By Frank H. Hodges, F.R.C.S., Ed.,

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Mary A. B., aged 18, a girl of nervous and emotional temperament, came under care as an out-patient of the Leicester Infirmary, 27th June, 1885, complaining that three days previously the sight of the right eye had suddenly and completely failed.

History.—She had been 6 weeks and 3 days in the Fever Hospital with scarlatina, and was now convalescent. On the morning of the 24th of June she got up at six a.m. She was about to go to bed at two p.m., in order to have her clothes disinfected, and was seated on a stool, when a mist came before both eyes, and she thought she was going to have a headache. In the course of a quarter of an hour V of R. E. was completely lost, and has never returned. The anticipated head ache did not occur. The sight of the same eye failed completely for about an hour, some ten days after her admission into hospital ; she was at this time in bed, and the attack was unattended by headache. She had occipital headache almost daily in hospital, but the sight never failed except in the two instances mentioned.

Present condition.—June 27th. R.V = no p.l. L.V = $\frac{6}{6}$ Em. R. pupil acts in conjunction with other, but not when its fellow is shaded. The ophthalmoscopic signs are characteristic of blockage of the central artery of the retina, the disc being obscured by a diffused white cloud. The cherry red spot at the macula is particularly well marked. No hæmorrhages are visible. The veins widen as they approach the periphery. Catamenia every three weeks ; lasts five days and loses much. Urine sp. g. 1,010, no albumen. My colleague, Dr. Blunt, who kindly examined the heart, reported "No cardiac disease, but action rapid, functional."

August 14th.—The retinal haze has now cleared away, leaving disc very pale and arteries thin.

The chief question of interest in this case is whether the arrest of circulation in the retinal artery was due to embolism or to thrombosis. Mr. Priestley Smith, in an able paper in the "Review" (Vol. III., Jan. and Feb., 1884), attempted to show that many so-called cases of embolism are really cases of spontaneous thrombosis. All the points which Mr. Priestley Smith lays down for the diagnosis of thrombosis were not present in the foregoing case, but the previous history of a transient failure of sight, and the fact that the mist which ushered in the attack of permanent loss of vision involved both eyes, present, I think, ample evidence that the case was one of thrombosis; this accords with the fact that the patient was a nervous, emotional girl, debilitated by scarlatina.

It will be observed that the transient failure occurred while the patient was lying in bed, and the permanent loss of vision when she had been up from 6 a.m. till 2 p.m., and was probably exhausted. The disastrous result affords a valuable therapeutic hint, viz., in any case where transient failure of vision has occurred in a person suffering from fever, or any other exhausting disease, to proceed gradually in allowing the patient to sit up during the period of convalescence.

W. UHTHOFF (Berlin). On Optic Atrophy. *Berlin. Hermann Peters*, 1884.

Uhthoff gives the following ætiological classification of 100 cases that presented themselves at Professor Schoeler's clinic with optic atrophy. It shows the relative frequency of these causes in a series of patients with optic atrophy who came to an ophthalmic surgeon for failure of vision.

	Cases.	Male. Per cent.	Female. Per cent.
1.—Spinal optic atrophy	37	70	30
2.—From cerebral cause	25	52	48
3.—After uncomplicated optic neuritis	6	67	33

	Cases.	Male. Per cent.	Female. Per cent.
4.—True simple progressive atrophy	5	60	40
5.—In paralytic dementia	5	80	20
6.—After embolism of arteria central. retinæ	5	20	80
7.—With hereditary history	3	67	33
8.—After injury	3	67	33
9.—Following a pathological process in orbit	2	50	50
10.—In lead poisoning	2	100	—
11.— After hæmorrhage	2	—	100
12.—From alcoholism	2	100	—
13.—From nephritis after neuro-retinitis	1	—	100
14.—In "railway spine"	1	100	—
15.—With epileptiform attacks	1	100	—

1.—*Spinal cases.*—The high percentage of these cases is a notable fact, for in a collection of 83 cases Leber found only 23 spinal, as against 37 simple progressive uncomplicated atrophies. Uhthoff finds that true simple progressive cases become rarer as the cases are more thoroughly investigated, and more especially when the cases are investigated at some interval. Not only would he consider absence of pupillary reflex and of knee jerk in a case of optic atrophy sufficient to place it among spinal cases, but he would even consider one of these sufficient, provided naturally that vision is preserved. This conclusion he has found justified in numerous cases by the subsequent appearance of other spinal symptoms. The age was usually from 30 to 50. Syphilis, from 17 to 28 years before, was present in about one-third of the cases. The optic nerve atrophy was always bilateral, and the progress to blindness was from one to three years in duration. He divides spinal cases into two classes, according to peculiarities of the visual fields. A.—Cases where the function of the optic nerve fails over the entire field; a more or less equal loss of colour perception and projection, and of peripheral and central visual acuity. Central vision fails progressively along with peripheral narrowing of the visual and colour fields: while one can prove an absolute peripheral defect of the visual field only in one direction, there is a distinct diminution of function in other parts of the field. The power of distinguishing green generally fails first, then that for red, and last that for yellow and blue. B.—Cases in which the optic nerve is only partially involved in the pathological process, the affected parts of the field being sharply bounded from the healthy. The lesion is very seldom stationary, the healthy parts generally getting involved at a later date. The field of vision shows sharply defined sector-shaped defects in one or more quadrants or concentric defective areas. Vision and colour sense in the retained central part may be perfectly normal. These cases are much rarer than the first in the proportion of one to four. Among the 37 cases of spinal optic atrophy he did not observe one with commencing central scotoma. Peripheral contraction with good central vision is not so rare in spinal cases as is generally believed. Uhthoff is doubtful whether the failure begins more frequently on the temporal or on the nasal side of the field.

2.—*From cerebral cause.*—These were cases where the atrophy resulted from disease of the brain and its membranes, including among them cases following neuritis and also those of ophthalmoscopically simple optic atrophy. In a fourth of the cases there were traces of old neuritis, in three-fourths there were none, but there can be little doubt that the neuritic origin was much more frequent than one-fourth. The greater number of cases were between 6 months and 17 years of age, and between 30 and 45 years. In six cases, all young, there was an undoubted history of meningitis. In two cases there was bilateral Argyll-Robertson pupil with partial vision, and in two there was loss of knee jerk. Presumably these were not the same cases. In one case, a girl 4½ years old, there was double optic atrophy with no perception of light for three months, but distinct pupillary reaction to light. Uhthoff records a similar case in an infant 6 months old, where probably there was defective development of the occipital lobe. The fields of vision could be taken in six cases. (1) Concentric narrowing, with loss of colour vision for red and green, and much loss of acuity in one case. (2) Central defect of field (*a*) with unaffected periphery in two cases, (*b*) with concurrent peripheral failure in one case. (3) Temporal hemianopsia in two cases. (4) Peculiar sharply defined defects of the visual fields, fairly symmetrical in the half of both fields of vision. in one case. Uhthoff gives the history and the fields of this case, stating that the diagnosis made was meningitis of chronic character, cerebral and spinal. (The left homonymous hemianopsia, right oculo-motor paralysis, olfactory and auditory sensations and left-sided disturbance of sensation in the earlier stages, with subsequently right-sided stiffness and incontinence of urine are, it seems to us, more consistent with tumour of the right temporo-sphenoidal lobe).

3.—*After uncomplicated optic neuritis.*—These cases were generally males about middle life, apparently otherwise healthy. In one case there was a history of syphilis, in another of chill from a cold bath, in other three cases no apparent cause was given. It was always bilateral, never progressed to blindness but to impaired vision of a more or less high degree. In three cases there was central scotoma with good peripheral field, in one case sharply defined extensive field defects with still normal function in the remaining parts of the fields, and in one case a peripheral limitation up and in with concurrent diminution of function in the retained part, green being no longer distinguished, and visual acuity much diminished. The knee jerks and pupillary reactions were present in all the patients.

4.—*Simple progressive atrophy.*—These Uhthoff believes to have been really from spinal or other central nervous disease, although from insufficient observation this was not substantiated. He does not, however, consider himself justified in saying that there is no such thing as simple progressive optic atrophy, as many neurologists believe.

5.—*In general paralysis of the insane.*—The percentage is probably too small, as naturally the ophthalmic surgeon sees only those cases where the visual precedes the mental defect. The ages were between 28 and 42. In three cases there was no pupilary reaction to light; in three there were unequal pupils; in three there were no knee jerks; in three cases the atrophy was one to two years before the paralytic mental symptoms; in two cases the latter were marked on the first appearance at the clinic. In the progress of the loss both of vision and of visual field these cases are like the spinal. In three cases the loss of field was that which is general in spinal cases, viz.: peripheral limitation, with concurrent limitation of function in the field remaining, loss of colour and vision, and diminution of visual acuity. In one case in the right eye there was a large sharply-defined field defect, while the upper and inner quadrant had good visual acuity Uhthoff has never seen this form of atrophy, beginning with a central scotoma, and believes such an occurrence to be very rare. He mentions a case formerly published as simple progressive atrophy, which eight years later developed general paralysis.

6.—*After embolism of arteria centralis retinæ.*—There was no cardiac lesion in any of the cases, but four of them came under observation years after the sudden blindness, and the other may have been either retro-bulbar intervaginal hæmorrhage or a retro-bulbar neuritis.

7.—*Atrophy of family type.*—These are neuritic atrophies, generally in males and in youth. The occurrence of central field defects, the termination in a high degree of amblyopia, but never in absolute blindness, with the complete failure of treatment, marks off these cases as a distinct group.

8.—*After injury.*—These cases were unilateral. In one case it occurred after orbital fracture, with cerebral symptoms; in another after a severe blow on the eye, without cerebral symptoms. In both the blindness was not complete; there remained a small eccentric piece of field, and fingers could be counted from 4 to 5 feet. In the third case the injury was doubtfully the cause.

10.—*In Lead Poisoning.*—In both cases observed there was a neuritic partial optic atrophy; the outer side of the disc quite atrophic, the inner pale but still with some colour, the retinal vessels somewhat smaller than normal. In both cases there was a high degree of amblyopia—fingers at 6′ to 7′, also a large absolute central defect of field in each eye, while the periphery was normal. (1) M., æt. 18, noticed rather sudden failure of sight four weeks after beginning his apprenticeship as a painter, during which time he had been working much with white lead. At first vision improved slightly under treatment, then remained as above. There were no other symptoms of lead poisoning. Urine was normal. (2) M., æt. 57, labourer in a rubber manufactory where he had much to do with lead. Other symptoms of lead poisoning were well marked: Argyll

Robertson pupils, and large central scotoma in each eye with loss of red and green fields. Vision remained the same, other symptoms improved. There was never albuminuria.

11.—*After Hæmorrhage.*—One of the cases was somewhat doubtful as to ætiology, the other was after abortion with severe hæmorrhage. Uhthoff believes that in such cases there is a neuritis or neuroretinitis which begins very early and very soon goes down.

12.—*After Alcoholism.*—In neither case was there complete blindness, V = fingers at 3′ to 4′ and had been so for some time. Of the visual fields there remained only small half ring-shaped zones, in which blue was still perceived in part. The papillæ were atrophic, with a trace of normal colour in the inner half in one patient. The ætiology was doubtful in one case; in the other there was excessive abuse of alcohol and tobacco.

14.—*In "Railway Spine."*—This case showed unilateral atrophic pallor of papilla with diminution of vision and concentric contraction of blue, red, and green fields, also general tremor with mental deterioration—the result of a railway collision, in which he received a severe blow on the occiput and probably also on the sacrum.

H. WILBRAND (Hamburg). Ophthalmic Contributions to the Diagnosis of Brain Diseases. 1 *vol. 8vo., pp.* 100, *with coloured plate. Wiesbaden: J. F. Bergmann*, 1884. *(Abridged from "Brain," 1885, p. 264.)*

The author divides the visual sense into light-perception, form-perception, and colour-perception, and devotes Chapter I. of his work to the statement of certain propositions as to the position and relation of the centres for these faculties.

From the fact that focal lesions in the optic radiations of Gratiolet beyond the primary optic centres at the posterior termination of the optic tracts abolish all three visual perceptions, he concludes that these primary optic centres do not bring optical impressions within the sphere of consciousness.

From the fact that in hemianopsia one of these faculties may be destroyed, the other two remaining intact, he concludes that these faculties reside in distinct centres, as no such condition ever results from disease of the chiasma or optic tract.

Lastly, from the fact that colour-vision may be destroyed alone, or may be destroyed along with partial or complete destruction of form-perception, and that the limits of the destruction of light-perception are always either the same or less extensive than those of the two other faculties, he concludes that the fibres concerned in colour and form-perception must pass through the light centre.

He considers that we have good ground for locating the visual centres at the apex of the occipital lobe, but does not decide whether the three centres for colour, form, and light are disposed in different layers of the cortex (the first being superficial), or side by side in the same layer. He elaborates his theory in considerable detail, and illustrates it by a coloured plate. Each proposition is supported by reference to cases collated in Chapter II. Some of the details necessarily possess an *à priori* rather than an inductive character, and it is not pretended that the proofs are in all points convincing.

Chapter II. is devoted to a classified record of cases of disturbance or destruction of colour, form, and light-perception, with an interesting account of amnesic colour-blindness.

In Chapter III., Wilbrand discusses the differential diagnosis of lateral, *i.e.*, homonymous hemianopsia as due to lesion of an optic tract, of the pulvinar, of the optic radiations, of the cortex, or of the two last combined. We subjoin a *résumé* of his conclusions :—1. In lesion of one optic tract we have lateral, *i.e.*, homonymous, hemianopsia of the opposite side, always absolute, *i.e.*, involving all three visual perceptions, and nearly always complete, *i.e.*, involving all the field of vision to the right or left of a vertical line through the fixation-point. Marchand's case of softening affecting the lateral part of one tract, shows that it is possible for the hemianopsia to be incomplete. Subsequent amaurosis invading the other halves of the two fields of vision, indicates invasion of the chiasma, and is in favour of affection of the optic tract rather than central lesion. Pupillary reflex on illumination of the retinal area involved is absent, or there may be a tardy reflex due to dispersion of light. With the bilateral hemianopsia following invasion of the chiasma, the pupil is dilated and motionless to light. Photopsiæ may be present.

2. In lesions of the pulvinar, the hemianopsia will be absolute and stationary, the pupil will react to illuminations of the implicated retinal area, and there will usually be temporary hemiplegia and hemianæsthesia.

3. In lesions of the optic radiations, the hemianopsia will be absolute, but complete or incomplete; the pupillary reflex will be retained; the patient will often have photopsiæ, and symptoms of hæmorrhage, &c., will usually be present.

4. In lesions of the cortex in the occipital region, the hemianopsia will be absolute or not absolute, complete or incomplete. A lesion of the tip of one occipital lobe may produce absolute and complete lateral, *i.e.*, homonymous, hemianopsia. Destruction of colour-vision, with retention of form and light-perception, probably means damage just behind the external parieto-occipital sulcus, and a gradual extinction of form and light-perception would imply extension of the lesion towards the tip of the occipital lobe. In cortical hemianopsia, the pupil reacts promptly to illumination of the implicated retinal area; and when the lesion is double, and there is therefore bilateral hemianopsia, both pupils still react. The patient in such cases never has photopsiæ, and it is impossible to produce them.

ERNST FUCHS (Vienna.) The Physiology and Pathology of the Closure of the Eyelids. *Von Graefe's Archiv., XXXI., 2, p. 97; and Medical Times, June* 13, 1885.

Fuchs calls attention to a cause of certain diseases of the eye which, unless specially looked for, is apt to escape notice, viz.: an imperfect closure of the eyelids during sleep, due to congenital shortness of the eyelids. In order to obtain an accurate anatomical basis from which to estimate the sufficiency or insufficiency of the eyelids in individual cases, he made a series of measurements of the parts in question in the eyes of a number of persons of different ages, a total of 420 eyes being examined. The measurements made were of three kinds, viz :—

1. *The height of the upper lid—i.e.*, the distance from the free margin of the lid to a horizontal line passing through the middle of the eyebrow. In making this measurement the patient is told to close his eyes softly, as in sleep; firm contraction of the lids vitiates it by depressing the brow. With patience, sufficient accuracy is easily obtained in adults, but in children the measurement must be made during sleep.

2. *The vertical stretch of the upper lid—i.e.*, the distance between the points above named, when the lid is gently stretched by drawing it down by means of the eyelashes as far as it can be drawn without causing the patient pain, the skin at the eyebrow being firmly held by an assistant.

3. *The length of the aperture—i.e.*, the distance from canthus to canthus. The results obtained are shown in the following table, the fourth column, headed by the word coefficient, giving the proportions existing between the vertical stretch and the height of the eyelid :—

Age.	Height of Lid.	Vertical Stretch.	Coefficient.	Width of Aperture.
0—1	12·5	18·5	1·5	18·5
3—4	17·9	29·9	1·7	22·9
4—5	20·4	33·6	1·6	24·0
5—6	19·5	32·9	1·7	24·2
6—7	20·5	34·2	1·6	24·5
7—8	21·5	35·9	1·7	24·6
8—9	21·1	36·0	1·7	25·2
9—10	21·2	35·9	1·6	25·5
10—12	22.3	36·0	1·6	25·5
12—15	23·5	38·3	1·6	27·1
15—20	24·4	39·3	1·6	27·9
20—30	24·1	41·7	1·8	28·5
30—40	24·2	42·8	1·8	27·5
40—50	25·3	44·0	1·8	28·2
50—60	23·1	43·3	1·8	27·1
60—80	23·6	45·1	1·9	26·5

The height of the lid is, in general, proportionate to the vertical height of the orbital aperture, which varies considerably in individuals of equal stature. It must be noted, however, that the eyebrow, the point from which the measurement was made, holds a variable position in relation to the margin of the orbit. In one-third of the cases the middle line of the brow coincides with the margin of the orbit, in the rest it lies more or less above it, the distance in some cases amounting to as much as 2 cm., which gives to the face a decidedly comical expression. The height of the lid increases rapidly in the first years of life, and then more slowly until the twentieth year; from the twentieth to the fiftieth year it does not alter; after the fiftieth year it diminishes, by reason of the slackness of the skin of the face and the consequent sinking of the brows. The growth of the lid corresponds, in general, with that of the orbit; the growth of the latter during the first two years of life is more rapid in proportion than that of the body as a whole; the orbit of a three-year-old child is not very much smaller than that of an adult.

The vertical stretch of the eyelid increases with the height of the lid, though somewhat more rapidly, until the twentieth year; beyond the twentieth year, while the height of the lid remains stationary for a long while and ultimately decreases, the vertical stretch continually increases, even to extreme old age. Hence the coefficient—*i.e.*, the proportion which the vertical stretch bears to the height of the eyelid constantly increases from infancy to old age; in new-born children it is, on the average, 1·5, in old people 1·8 or 1·9. The visible expression of this change is, that with increasing age the skin of the eyelid becomes more and more folded and wrinkled. In the lightly closed eyelids of children there are often no wrinkles at all, while in those of old people the skin frequently hangs in deep folds. This difference depends, however, not entirely on an increase of skin, but to some extent on a loss of its elasticity, as may be proved by comparing a child and an elderly man in whom the coefficients are equal; the proportion between the amount of skin and the surface to be covered being the same in both, one might expect to find the same degree of folding in the skin, but in reality, one finds few or no folds in the child's eyelid, many in that of the man.

The length of the aperture in individual cases varies much less from the average than do the dimensions already referred to, and the increase of this length during the period of growth is also smaller in proportion. Thus, while the height of the lid and of the orbital aperture are nearly doubled between birth and adult age, the length of the lid aperture is only about half as long again in the adult as in the new-born child. This disproportionate length of the aperture, together with the elasticity of the skin, account for the widely open eyes of children.

Lagothalmos, or hare-eye—the condition in which the eyelids cannot be properly closed—so called from the popular belief that hares sleep with their eyes open, is usually due to an acquired defect of the lids, viz., ectropion, caused by ulceration of the skin covering them, caries of the margin of the orbit, injuries, &c., or to paralysis of the orbicularis, or to exophthalmos ; in very rare cases it may be due to congenital absence or extreme shortness of the lids. In addition to these well-recognised conditions there are cases of no infrequent occurrence in which a slight insufficiency of the eyelids causes imperfect closure during sleep, and thus leads to overflow of tears, chronic conjunctivitis, and especially to blepharitis. These cases have hitherto received little attention. The insufficiency of the eyelids is not obvious, and it is not recognised as the cause of the persistent irritation of the eye. As a general rule closure of the lids during sleep is incomplete if the "coefficient" is less than 1·5, *i.e.*, if the extent of the skin when put on the stretch is not greater by one half than the vertical height of the gently closed lid.

Insufficient length of the eyelids announces itself by the following symptoms :—When the patient is asked to close his eyes quite gently, as in sleep, the margins of the lids do not touch each other, but remain separated by a slight interval. By an effort the patient can close his eyes completely, but then the skin of the lids is seen to be tensely stretched ; all the horizontal lines are smoothed out, and in their place vertical folds make their appearance, testifying to the tension of the skin. Since, therefore, it requires a certain effort to completely close the eyes, which effort can only be kept up when the patient is awake, the palpebral cleft must remain somewhat open during sleep. Whenever, therefore, one suspects incomplete closure of the lids, one should ask the patient's friends to observe him during sleep ; they will state that when he is asleep, the white of his eye can be seen through the palpebral cleft, but not the cornea (except in very pronounced cases).

The first result of incomplete closure of the lids is overflow of tears, and this in many cases is associated with chronic catarrh, and, especially in children, with blepharitis as well. These conditions are undoubtedly due to the overflow of tears, for we observe them also in cases in which the escape of tears is interfered with by other causes. The blepharitis usually appears in the ulcerative form, and is obstinate. The swelling and stiffness of the lids which result from the catarrh and the blepharitis still further shorten the lids, and thus a vicious circle is established which renders spontaneous recovery almost an impossibility. The cornea is exposed to danger only in rare cases of extreme shortness.

It might be urged that in such cases the blepharitis is the primary fault, the shortening of the lid the secondary one ; but by taking measurements during and after blepharitis, Fuchs has convinced himself that insufficiency of the eyelid is frequently a pre-existing condition and the essential cause of the inflammatory trouble.

It is true that sleeping with the eyes open is sometimes met with in persons whose eyelids are perfectly normal. Fuchs observed this peculiar habit in several members of the same family ; the most striking example being that of a lady who, with all her children, five in number, slept with eyes half open. Although no discomfort may be complained of in these cases, should one of the individuals in question happen to contract an acute conjunctival catarrh, the disease tends to last longer than usual, and is very apt to become complicated with blepharitis and to pass into a chronic state.

It is of practical importance to have a correct appreciation of this congenital shortness of the lids and the incomplete closure of the eyes that results from it, otherwise the overflow of tears and the blepharitis produced by it may long be treated in vain. In such cases it is important to secure complete closure of the eyelids during sleep. When troublesome overflow of tears is the sole consequence of sleeping with the eyes open, the eyes should be lightly bandaged over-night. If blepharitis is also present, ointments, preferably the white precipitate ointment, should be used as well as the bandage, the margins of the lids being well rubbed with the ointment before going to bed, and a piece of linen covered with the ointment placed on the closed eyes, and secured with a light bandage. If the shortness of the eyelids is very pronounced, tarsoraphy is indicated. Fuchs performed it in one case with complete success.

HIRSCHBERG (Berlin). On the Connection between Epicanthus and Ophthalmoplegia. *Neurolog., Centralbl.*, 1885, *No.* 13.

Hirschberg recently showed in the Berlin Society for Psychiatry and Nervous Diseases two patients, a father and son, whose cases throw an interesting light on the rare condition termed epicanthus.

The father, a Russian, aged 31, came to him with typical total ophthalmoplegia of both eyes—double ptosis with complete inability to raise, to abduct, or to adduct either eyeball. Slight downward movement with rotation showed the presence of slight action of the superior oblique muscle. There was great breadth of the upper lids (28 mm.). V. $\frac{15}{70}$ and Sn. 1½. No paralysis of accommodation. Pupils of medium size, normal reaction. Optic nerves normal. The rest of the nervous system intact. The patient stated that his trouble was congenital, and that his mother and his son had the same condition, also that his grandmother was similarly effected in consequence of a severe blow.

The son, an infant of nine months, showed, Hirschberg says, the usual appearance of paralytic epicanthus, that is double ptosis with extreme breadth of upper lids (20 mm.) and narrow palpebral fissure (8 mm.), the distance between the inner canthi being 25 mm.; also inability to raise the eyeballs, but good power of abduction, adduction, and depression. The eyes were in a state of divergence, as were also the father's, but this in the infant alternated with spasmodic convergence. The fold of skin extending from the upper to the lower lid over the inner canthus, and usually regarded as the characteristic of epicanthus was absent in both cases apparently; but Hirschberg states that von Græfe was in the habit of emphasizing that the essential point is not the cutaneous fold but a paresis of the levator palpebræ and the rectus superior. The defect in these cases seemed to be a congenital aplasia of the grey nuclei below the aqueduct of Sylvius, which in order from before backwards are those for accommodation, for pupil-contraction, for the recti internus, superior, levator palpebræ, and rectus superior. In the boy the nuclei of the superior rectus and levator palpebræ were absent, while in the man they were all wanting except those for accommodation and pupillary action, and at the same time the nucleus of the sixth nerve in the floor of the fourth ventricle was absent, while the nucleus of the fourth nerve was at least partially developed.

HENRY D. NOYES (New York). On the Tests for Muscular Asthenopia and on Insufficiency of the External Recti. *Reprinted from Transactions of Eighth Internat. Med. Congress*, 1884.

This paper is based on the records of eighty-two cases of insufficiency of the external recti. The conclusions arrived at are summarised as follows :—

That an examination for muscular asthenopia should include adduction and abduction at both extremities of the range of fusion, by which is meant that the powers of adduction and abduction should be tested by prisms for an object situated at 20 feet, and also for one situated at 1 foot distance from the eyes. That the equilibrium test (v. Graefe) has great value, but must be employed in connection with the preceding test. That the use of atropia is often essential to correct diagnosis, and is a great help in treatment, and that its exhibition does not in asthenopic cases prevent us from discovering the real capacity of the external muscles. That in certain cases of error in abduction there may be brought about a condition of debility of adduction which is a secondary effect, and is sometimes relieved by adduction prisms—*i.e.*, prisms with bases outwards—alone, and sometimes by abduction prisms for near and adduction prisms for distant objects. That muscular insufficiency of the externi is more common than has been believed, and that it may long remain latent. That weak adduction prisms continuously worn have a notable influence in improving the strength of the muscles, and bringing about that condition of repose of the visual axes which is the object to be sought for in treating muscular asthenopia, and is not always identical with the state of equilibrium as indicated by the vertical diplopia test. General constitutional treatment should never be neglected.

Noyes divides muscula rasthenopia into idiopathic and reflex ; the former due to an intrinsic incapacity in the affected muscles, the latter to impaired central energy (by which he does not mean a want of central fusion) from debilitating diseases, &c., &c.

He distinguishes the state of equilibrium from that of repose by the latter meaning not the absence of muscular tension but the presence of that degree of tension which the muscles are able to maintain with comfort. It exists when work in near objects can be performed without irritation, fatigue, or pain ; when this is not the case asthenopia is present although our tests may proclaim muscular equilibrium. The confusion here displayed is not an affair of terminology alone. The author seems to imagine that there are other positions besides that of equilibrium which the eyeballs can maintain indefinitely without fatigue, pain, &c., a contention opposed to all physiological principles.

The main object of the paper seems to be to obtain for the external recti a higher meed of regard than they have hitherto had, and to which their powers for good and ill entitle them. This position is established by the record of 82 cases of insufficiency of the external recti, the refraction being E in 20 cases, M in 13, H in 30, and astigmatism in 19, and the amount of ametropia being on the whole small.

In treatment the use of atropia, adduction prisms, and tenotomy of the interni have severally and in combination proved successful, and more than half the cases have a record of successful cure.

Thanks are due to Dr. Noyes for the attention which he has called to a subject which is no doubt somewhat neglected, but which is not nearly so much neglected as he seems to believe. It would be a vast assistance to those who study his writings if he would in future make use of the metre-angle notation of Nagel, and conform to the custom of the scientific ophthalmological world by adopting also the metric system of lenses.

W. A. BRAILEY (London). On Stretching of the Supra-trochlear Nerve. *Brit. Med. Journal, Oct.* 10, 1885.

This paper, which was read in the Section of Ophthalmology and Otology at the annual meeting of the British Medical Association in Cardiff, will help towards a determination of the value and scope of nerve-stretching in ophthalmic surgery. The operation was first brought forward, in 1882, by Badal of Bordeaux (*vide* O.R., Vol. III., pp. 49 and 276), who believed that it might prove effective, not only in ciliary neuralgia, but against certain forms of glaucoma, and even in sympathetic ophthalmia. For a guide to the exact position of the nerve, which lies deeply on the periosteum, Badal directed that the finger should be laid, palmar surface forwards, close under, and parallel to the orbital margin; then the centre of the finger-nail just corresponds to the point of emergence of the nerve from the orbital cavity. A curved incision, about ten millimetres long, in the line of the finger, will cross the track of the nerve, which not unfrequently passes out in two or three filaments. Following Badal, Abadie practised stretching of this nerve in a glaucomatous eye, which remained hard and painful even after a sclerotomy followed by an iridectomy. He stretched the nerve to rupture, and removed about a centimetre of its proximal portion. The tension slowly sank during three days to normal, and the vision slowly and slightly improved; also the pain was relieved. Since then he has recorded encouraging cases where nerve-stretching was combined with either iridectomy or sclerotomy, even in such unpromising maladies as congenital hydrophthalmia. However, he expressly states that he does not think that nerve-stretching can, at the present time, be accepted as supplanting iridectomy or sclerotomy; but that it should be reserved for the intractable cases which have resisted all other means of cure. He suggests its probable utility in congenital hydrophthalmia; also in the glaucoma of children secondary to synechia anterior, on the ground that the loss of the eye is due to the continuous traction on the nerves entangled in the scar. Where he practises this operation for the cure of glaucoma, he combines it with a simultaneous sclerotomy.

Brailey has tested the power of the operation to relieve ciliary neuralgia and to lower tension; in one case he stretched the supraorbital nerve in order to compare the effects of such stretching in the case of the two nerves respectively. He publishes the following notes of six cases :—

Case 1.—George B., aged 49, came in January 23rd, 1884, suffering from left-sided glaucoma, the result of iritis, following a cataract extraction five years ago. It appeared that the tension was slightly in excess, even a month after the cataract operation. When he came this time it was + 2, though this much heightened tension was apparently an affair of five weeks only, during which time the vision, which had till then been deteriorating very gradually, failed much more rapidly. On the following day the left supratrochlear nerve was stretched to rupture, and a piece four millimetres long excised. In three days the tension had fallen from + 2 to + $\frac{1}{2}$. In six days it was a full normal. The vision slightly improved ; with + 10D it was now $\frac{6}{60}$. The pain in his brow, of which he had previously complained, quite left him.

Case 2.—George C., aged 67, came in November, 1884, with commencing nuclear cataract of left eye, and glaucoma absolutum of right. Tension + 3. Perception of light. He said that the sight went gradually twenty years ago. He complained of considerable pain over right brow. As this eye presented a good appearance, and as he was specially anxious to avoid excision, the supratrochlear nerve was stretched. There was considerable suppuration from the wound, but the tension gradually fell till it was certainly not more than + 1 ten days later. The pains were entirely relieved, and have not recurred. This is the first exemption he has had for several weeks. He is again in hospital, but this time for extraction in the other eye, and now, two weeks after the operation, bids fair to regain capital sight.

Case 3.—Harriet K., aged 41. Double iridectomy had been performed elsewhere for glaucoma three years ago. She had still some tension in each eye, with enduring pain over the left brow. The pupils contract to eserine, which, however, was of no benefit in reducing either pain or tension. After stretching of both supratrochlear nerves, the wounds healed very rapidly, and the tension fell to full on the right side and to normal on the left. The pain was entirely relieved for a month, but it then recurred, together with the tension. Neither symptom was quite so acute as before. The vision remained the same, that is $= \frac{6}{60}$ in the right and $= \frac{6}{24}$ in the left eye.

Case 4.—Caroline A., aged 63. Stretching of both supratrochlears and both supraorbitals, working from above the brow on the left side and below it on the right. Left eye absolute glaucoma, tension + 3, with no perception of light, and dilated, fixed, and eccentric pupil, and some supraorbital pain. Right eye tension + 3, vision $\frac{6}{12}$ badly; inflammatory symptoms very slight. There was primary union of all the wounds except the left supraorbital, that is the one approached from above the brow, which suppurated, though not extensively. There was no relief of pain, though the tension on each side fell to + 1. Sclerotomy, and then iridectomy subsequently performed on the left eye, whose vision ultimately remained $\frac{6}{12}$. Its tension remained + 1, notwithstanding that all these procedures were apparently well executed. The other remained as hard as ever, and was at last excised.

Case 5.—Thomas C., aged 75, had glaucoma absolutum on the left side, with severe pain spreading over all that side of the head, from the occiput forwards. On the next day, after stretching of the supratrochlear, the pain was certainly much relieved, but, five days later, it came on almost as badly as before. The eye was excised two weeks afterwards, with entire relief. In this case, the wound healed by first intention.

Case 6.—Setonia W., aged 55, had a severe choroido-cyclitis of the left eye, indicated by very defective sight, and large flocculent hæmorrhages in the vitreous. The right eye had only perception of light, with excluded pupil, and iris slightly bulged. The disease had commenced in this eye two and a half years ago, with just the same symptoms as the other, which was now apparently running the same course. There was severe pain in and around both eyes. No reasonable suggestion as to the nature of the inflammation could be given, and the left eye, which still retained $V = \frac{6}{60}$, became gradually worse, notwithstanding a varied and full use of drugs. The pain continued unrelieved, and the vision gradually fell to perception of light only. The nerve was, as a last resort, stretched on each side. The pain was thereby certainly diminished, and the tension, which, within narrow limits of normal had varied very much, fell slightly. But, eight days later, the left eye had blood in the anterior chamber, and the tension rose to + 1. Four days later again, severe iritis manifested itself in the left eye, the iris having up till now been of good colour and activity, and both eyes became rather soft. After this, the hyphæma increased, and the pain recurred. Finally, some weeks later, the anterior chamber became enormously deep. Ten days later, a similar, though less severe, attack manifested itself in the right eye, the anterior chamber becoming deepened, and revealing the existence of numerous marginal anterior synechiæ. Since then, the eyes have gradually become quiet, though not in the least better as regards vision. The pain better than before the nerve-stretching. Iridectomy on the left, six months later, with impunity, though without benefit as regards vision, on account of opacity of the lens.

The author declares his intention, for the future, to restrict the operation to maladies where, on the strength of the preceding cases, there is good ground for expecting some benefit: in the neuralgia of glaucoma absolutum, for example, and in intractable cases of glaucoma generally. In ordinary cases of glaucoma he is satisfied that it exercises no beneficial effect on the tension, and at best only a very doubtful one on the neuralgia ; considerable subsequent pain around the margin of the numbed area was frequently complained of.

He believes that stretching of the supratrochlear nerve has some influence on the tension, but is not worth counting on in this respect as a remedy against glaucoma, though it is still of use as an adjunct. With regard to the anatomical position of this nerve, he finds another guide of easier application than that of Badal. This, which was first suggested by one of his dressers, Mr. H. E. Jones, consists in the drawing of an imaginary line from the outer angle of the mouth to the inner canthus of the eye of the same side, and so onwards. This continuation will be in the line of the nerve as it emerges from the margin of the orbit. The curved incision will then cross this line at right angles, and the nerve will be found deep, indeed, right on the periosteum at its centre. Though it appears a very small nerve to the anatomist, there is less difficulty in finding and isolating it than might be expected.

At the same meeting, Mr. Richardson Cross showed a man whose supraorbital nerve he had stretched, nine days previously, for intense neuralgia in the left eye, shooting up the forehead, of three months' duration. No vascular or muscular abnormity was present. The pain was most intense, and recurred every few minutes. It was specially produced by chewing or drinking. The nerve was exposed just outside the tarsal fascia, and stretched until it was felt to give way. The result was that scarcely any pain had since been felt, and the man was now quite well. No change in tension, or in the vascular condition of the eye or of the pupil, followed the operation.

DR. ELIZABETH SARGENT (San Francisco). The Anatomy of Glaucoma. *Centralbl. f. Augenheilk., Dec., 1884, p.* 353.

Accurate anatomical observations are always of interest, and the appearances found by Dr. Sargent in a series of six glaucomatous eyes enucleated at the Zurich Clinique are worth study.

CASE I.—*Absolute glaucoma (from gl. simplex).*—Pannus of the corneal margin, with masses of round cells, the substantia propria loose, and the superficial epithelium rough. The anterior scleral and episcleral vessels surrounded by cells; Schlemm's canal patent. Anterior chamber shallow, iris atrophic, with peripheral adhesion to cornea. Pupil wide. Circular fibres of ciliary muscle best developed. A few granular collections in vessels of corpus ciliare, and some groups of round cells near the circulus iridis major. The larger ciliary processes mostly in contact with the iris root, and often bent on themselves; the pigment partly atrophic, partly normal; and the vessels containing blood discs. Lens and capsule normal. Choroidal vessels fairly full, a few granular masses in the veins, the choroidal pigment normal. Retina detached; probably a post-mortem change. Cystic degeneration in the ora serrata, the bacillary layer not affected. The retinal layers everywhere well preserved, the membrana limitans interna alone a little detached. The walls of the retinal vessels somewhat sclerosed. The pigment layer adherent to the choroid. The optic disc excavated to the edge, with thick bridges of nerve tissue lying on the walls and floor of the excavation ; the connective tissue infiltrated and containing blood vessels. The nerve bundles beyond the lamina cribrosa broad, but granular, and the intervaginal spaces wide. The endothelium in a state of proliferation.

Case 2.—*Absolute glaucoma (after gl. simplex).*—Marginal pannus of cornea and superficial ulceration. Anterior scleral and episcleral vessels with round cells along their walls. Anterior chamber obliterated. Iris atrophic, mostly adherent to cornea. Ciliary muscle not irregular, its vessels large. The ciliary processes mostly long and atrophic, their pigment most irregular. The zonula ruptured, the lens large, displaced, nearly globular, and completely cataractous. The vitreous containing hæmorrhages, large round cells, and granular masses. Choroid normal. Retina atrophic more in front than behind, and more on one side than on the other. Its smaller vessels varicose in appearance, with hyaline thickening of their walls. Disc not very deeply excavated, but lamina cribrosa distended backwards. The nerve very atrophic, and with cellular infiltration both before and behind the lamina cribrosa. Intervaginal space large.

Case 3.—*Glaucoma absolutum after primary chronic inflammatory glaucoma.*—Marginal pannus of cornea. Epithelium rough, new connective tissue replacing in part Bowman's membrane, numerous round cells all through the substantia propria, and deposits of cells and pigment on Descemet's membrane. Anterior scleral and episcleral vessels with round cells outside their walls. Schlemm's canal patent and surrounded by pigment. Anterior chamber shallow. Iris swollen, adherent to cornea at periphery, and showing inflammatory changes. Pupil wide. Circular fibres of ciliary muscle well developed. The vessels of the processes distended, some of the processes pressing against the root of the iris, and others showing signs of such pressure having previously existed. Pigment of uvea generally well developed. Hæmorrhages in vitreous, and round cells and pigment cells. Choroidal veins mostly normal, but a few containing granular masses. Retina completely detached, with signs of past inflammation, in parts atrophic. Lamina cribrosa much distended, and delicate bridges of connective tissue crossing the excavation. The nerve atrophic and with cellular infiltration. Intervaginal space wide. The endothelium proliferating.

Case 4.—*Secondary glaucoma (absolute) after iritis.*—Pannus of corneal margin, with round cells grouped round the vessels, and some blisters in the corneal epithelium. Anterior scleral and episcleral vessels distended. Schlemm's canal closed. Anterior chamber narrow, and its angle obliterated. Pupil wide. Iris tissue swollen, inflammatory exudations and adhesions to lens capsule. Veins of ciliary body containing firm granular masses. Ciliary muscle regular. Ciliary processes extremely long in some sections, and their pigment atrophied. Some of the processes adherent to each other, and the blood vessels well filled. The zonula apparently stretched. The lens cataractous, with large capsular cataract both at anterior and posterior pole. A few round cells in anterior portion of shrunken vitreous. Choroidal veins distended with blood, or containing firm finely granular matter. Arteries mostly empty. Pigment normal. Glandular formation on the lamina vitrea, and a few collections of round cells. Retina completely detached, by cyclitic changes and subretinal exudation. Cystic degeneration most marked near the disc. The nervous tissues atrophic, the connective tissue hypertrophic. The bacillary layer universally atrophied (colloid masses replacing the rods and cones), but the other layers preserved in places. Disc excavated so that the lamina cribrosa bulges beyond the outer surface of the sclerotica. The nerve bundles atrophied.

Case 5.—*Secondary glaucoma (absolute) after injury, with dislocation of lens and synechia anterior.*— Pannus of whole cornea. No superficial scar, but Descemet's membrane pierced by inflammatory tissue connecting the iris and the substantia propria corneæ. Anterior scleral and episcleral vessels distended and accompanied by round cells. Schlemm's canal partly patent, partly obstructed. Anterior chamber very shallow, containing remnants of calcified lens, its angle in part obliterated. The iris extensively adherent to cornea and atrophic, except for a partial proliferation of the sphincter. Pupil wide. Zonula torn; ciliary muscle regular. Vessels of the ciliary processes well filled. Some of the processes elongated and bent backwards, others bent towards the root of the iris, their pigment extensively atrophied. Choroidal pigment normal, veins containing firm granular masses. Retina highly atrophic with cystic degeneration, and complete destruction of the bacillary layer. Pigment layer most irregular, and pigment masses lying in other layers. The vessels contain homogeneous highly refracting matter. Disc excavated. The nerve fibres atrophied, and a cellular infiltration both before and behind the lamina cribrosa.

Case 6.—*Secondary glaucoma (absolute) from luxation of a shrunken lens.*—Marginal pannus of cornea, and the anterior scleral and episcleral vessels distended and accompanied by round cells. Schlemm's canal patent. Anterior chamber obliterated, except for space taken up by the shrunken lens. Iris adherent to cornea at periphery and to posterior surface of lens more centrally. Its tissue atrophic. Ciliary muscle well developed, but regular, contains a few masses of round cells. Ciliary processes adherent to each other, their pigment either atrophic or hypertrophic. A thick plaster exudation lying behind the ciliary body. The zonula ruptured. The vitreous shrunken, containing new blood vessels in a state of distension, a few round cells and pigment granules. In anterior segment of choroid, the arteries empty, the veins filled with granular matter, colloid growths on the lamina vitrea and some few round cells. Choroidal pigment normal. Some patches of calcareous degeneration. Retina detached, exceedingly atrophic, the bacillary layer replaced by colloid masses. Some arteries showing sclerosed walls, and filled with brittle thrombus. Cellular infiltration of the nerve and its sheaths, and atrophy of the nerve in neighbourhood of the globe. Well marked excavation.

The cardinal points in all the cases are excavation of the disc, and peripheral adhesions of the iris and cornea both in the primary and secondary forms of glaucoma. Equally constant are the signs of cellular infiltration in the anterior scleral region, and the changes in the cornea. The essential difference between the primary and secondary forms (at least in this advanced stage) is to be found in the condition of the retina, which in the primary forms shows little beyond prematurely senile changes. Attention is called to the frequency of cellular infiltration of the optic nerve behind the lamina cribrosa and of its sheaths.

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HEREDITARY SYPHILIS, DENTAL MALFORMATIONS, AND DIFFUSE INTERSTITIAL KERATITIS.

By Arthur W. W. Baker, M.B., B.Ch., and John B. Story, M.B., F.R.C.S.I. (Dublin).*

Since Mr. Jonathan Hutchinson nearly a quarter of a century ago published in the Ophthalmic Hospital Reports his classical paper upon the syphilitic inflammations of the eye, few medical men in the British Islands have refused to acknowledge the close connection between hereditary syphilis, the peculiar form of notched teeth described for the first time in that paper, and diffuse interstitial keratitis. On the continent of Europe, however, this view is not universally accepted. The writer of the article upon the pathology of the cornea in Græfe and Sæmisch's hand-book, while grudgingly admitting that hereditary syphilis is present in a certain number of the cases, and therefore must be allowed to play an important part in the production of diffuse interstitial keratitis, lays far more stress upon the proposition that this disease is by no means to be regarded as a distinctly specific inflammation, but is commonly found in individuals whose nutrition is defective from many other causes than syphilis.

Schweigger, too, in the third edition of his handbook, throws doubt upon Hutchinson's views, the disease (of the cornea) in his experience occurring in individuals without syphilitic taint, and the characteristic teeth being absent in a very large proportion of the cases. Zehender's "Lehrbuch" for Students actually omits this form of keratitis altogether, which is the more surprising as Hutchinson's views are well known in Germany, statistics being quoted in Græfe and Sæmisch's hand-book from German observers who have described the disease and found hereditary syphilis present in as many as fifty or sixty per cent. of the individuals affected. In France, Hutchinson's theory has the powerful support of De Wecker, and in Switzerland that of Prof. Horner, both of whom recognise the syphilitic nature of the keratitis, at all events in the vast majority of the cases, and the syphilitic markings on the incisor teeth. Opinion in this country may be estimated by Nettleship's statement in the second edition of his "Students' Guide," that in sixty-eight per cent. of the cases he had himself observed there existed other evidence either in the state of the patient or in the family history for connecting this peculiar keratitis with inherited syphilis. The number of observations is not stated, so that possibly the statistics may be drawn from but a limited experience, but to anyone who has practical knowledge of the extreme difficulty of investigations into a matter of this kind, such a percentage is evidence of a probability almost overwhelming.

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* A portion of this paper was read in the Ophthalmological Section of the British Medical Association Meeting at Belfast.

The present paper is published more for the purpose of drawing attention to the highly interesting and important questions at issue than in the belief that its contents will lend more than a very slight assistance towards their elucidation. It contains a brief abstract of the notes taken either at St. Mark's Ophthalmic or at the Dental Hospital of any cases of diffuse interstitial keratitis or of notched teeth that were observed during a period of more than two years, and to these are added a few cases from private note-books. All the cases of which any records could be obtained are included, but as most of the notes when originally made were not taken for this special purpose errors have no doubt crept in, cases being probably in the list which a more careful examination would have excluded as not really typical examples of the disease or deformity under consideration.

The following abbreviations are used in the records of the cases. M., male. F., female. K., keratitis interstitialis diffusa. H. T., Hutchinson's (notched syphilitic) teeth. The number after the letter denoting the sex gives the age of the patient. By rachitic teeth is meant the peculiar deformity ascribed by Prof. Horner to infantile rickets and by Mr. Hutchinson to the use of mercury.

1. F., 27. K. right and left. H. T. Is nursing a baby ten months old.

2. M., 14. K. right and left. Teeth normal. Has one elder brother reputed healthy.

3. M., 17. K. left. Upper canines "suspicious." Is eldest child Five others alive, and reputed healthy; the third child dead.

4. M., 27. Diffuse haze of lower half of right cornea. Teeth normal. No brother, but one who died young.

5. M., 15. Diffuse haze of centre of right cornea. Teeth normal.

6. M., 9. K. right and left. Teeth not noted. Is youngest of six children, the eldest having lived fourteen days, and the rest having been dead born. Husband had "a bad throat," and used to complain of a pain in his eye.

7. M., 12. K. right eye. H. T. typical. Left eye destroyed by what was probably K., which was treated elsewhere six months ago. Boy is very deaf. Maternal syphilis known from medical man who treated her. The boy has scars at angles of mouth, and the thorax covered with large circular cicatrices probably due to syphilitic rupia. The right eye became, in spite of treatment, eventually blind, and for a time the boy was quite off his head.

8. M., 13. K. Teeth normal. Parents had eight children, the first still-born, the second lived six weeks.

9. M., 9. K. right and left. H. T. Teeth also rachitic. Has three brothers alive, two brothers and one sister dead. Mother had "erysipelas" shortly after marriage,

with sore throat, spots all over her, and loss of hair—evidently syphilis. She has now large cicatrices all over her right leg, the result of a chronic cutaneous eruption. The boy, when seen five or six months later, had numerous iritic adhesions, and well marked nodes on both tibiæ.

10. F., 22. K. left. H. T.

11. F., 15. K. right with iritis. H. T. One brother and two sisters alive; one brother, believed to have been the eldest of family, dead.

12. F., 13. K. left with iritis. H. T. Scars at angles of mouth, almost quite deaf. Patient is eldest of family. Her mother had eight children, three miscarriages, and one still-born child.

13. M., 17. K. right. No further notes.

14. M., 25. Faint K. left. Teeth normal.

15. F., 19. Opacity of corneæ after K. five years ago, synechiæ posteriores in both, and central and peripheral choroiditis in right. H. T. Two elder brothers and one younger sister alive. The eldest two of the family died in infancy. The sister's teeth are normal, except for slight pegging of the upper central incisors.

16. F., 12. K. right and left. H. T. Mother dead. Two children alive out of four births.

17. F., 16. K. right. H. T. Scars on face, and bridge of nose depressed.

18. F., 19. K. right. H. T. Eight brothers and sisters born alive, seven still-born, this girl the youngest.

19. M., 13. K. right and left. H. T. The mother was told by her nurse that her troubles arose from the "bad disorder" given her by her husband, as she had spots all over her. Her first child died at birth, her second one was healthy. The boy now under treatment always had bad eyes.

20. M., 7. K. right and left. Has only teeth of first dentition. Mother had two miscarriages and one child dead born. The father was in the army. During the treatment of the keratitis two lower incisors of the second dentition were erupted, and both as soon as they appeared above the gum exhibited typical notches cut as cleanly as if by a chisel. These teeth were also peg shaped.

21. F., 8. Eyes two years affected. Corneæ hazy and slightly vascular. Synechiæ posteriores. H. T. typical. The teeth also exhibit the peculiarity of not meeting when the jaws are closed. Patient is a deaf mute with chronic ozæna.

22. M., 15. Partial K. with commencing vascularisation of cornea. H. T. Upper incisors most marked. Mother had three miscarriages, and eleven children, of whom only three are alive. All except one died during the first four weeks of life.

23. F., 14. Punctiform opacities diffused through the tissue of both corneæ, and extensive synechiæ posteriores. H. T. Patient is very deaf. Resides in an orphanage.

24. M., 25. K. right and left. Teeth normal. The corneal inflammation though registered as K. was not thought at the time to be typical. Disease probably not specific.

25. M., 25. K. left, with partial anæsthesia of cornea, and slightly subnormal tension. Obscure history of injury. No iritis. Teeth normal. Probably not to be regarded as a case of K., as diagnosis at the time was noted as doubtful.

26. M., 16. K. right and left with high tension. In right eye traumatic cataract. Teeth not noted. Father admitted to having had syphilis, and having infected his wife nine years before patient's birth.

27. F., 14. K. Teeth not typical, noted as "suspicious."

28. F., 7. K., right and left. H. T.

29. F., 19. K., left, with vascularisation of cornea. H. T. The angles of mouth scarred.

30. M., 12. K. H. T. Face covered with blotches.

31. F., 30. K., right. No note of teeth.

32. M., 17. K., right and left. Teeth not abnormal, but palate very highly arched. Patient has formerly been treated for "otitis media chronica." Father admits to having had syphilis.

33. F., 18. Corneæ hazy, from what was probably K., and synechiæ posteriores right and left. H. T. Is partially deaf, has a deeply depressed bridge to nose, and numerous scars on face. Patient is eldest child, and was treated elsewhere, five years ago, for "inflammation of the eyes"—no doubt K. Father denies having had syphilis; is, however, prematurely bald and partially deaf. A younger sister who came with her looks

perfectly healthy, a strong contrast to the patient, whose appearance, to an experienced eye, is characteristic of hereditary syphilis.

34. M., 27. K., right, and, after a year's interval, left also. H. T. Very highly arched palate. Is second child; the eldest died at age of six months, the third at age of two years.

35. M., 18. K., left, ant. chamber deep, T + 1. Subsequently iritis, accelerated by eserine used to reduce the tension. H. T. History of parental syphilis from the boy's uncle, a medical man. Patient is the eldest child alive. His right eye was operated on in infancy for cataract. The operation has not been successful, probably owing to a glaucomatous attack, as the disc in that eye is deeply excavated.

36. F., 5. K., right and left. No note of teeth. Mother denies having had syphilis, but of her seven children five are dead, either at birth, or from "a rash in childhood."

37. F., 27. K., at age of twenty-one, treated by Mr. Story. Now has haziness of both corneæ, and deep ant. chambers. Synechiæ posteriores in left eye. H. T. Hearing is defective, and both drum-heads dull and white.

38. M., 18. K., right and left. H. T. Father denies syphilis, but admits "clap." He had a very bad eye before marriage, and has now numerous synechiæ posteriores on the left side. This boy is the third child. Two elder sisters are alive and married, and reputed healthy. Between their birth and that of the patient his mother had two miscarriages.

39. M., 22. K., right. No note of teeth.

40. M., 23. K., left, the upper segment of cornea chiefly affected. Teeth not typical, but "suspicious." Has three brothers and one sister living, two brothers died as babies. Patient is slightly deaf from "a cold" of two months' standing.

41. M., 20. K., with iritis and lymph in ant. chamber, right. Some two months later left also affected with K. and iritis. K. cured by mercury. Was five months in hospital. Teeth normal.

42. F., 23. K., right and left. H. T. Central incisors notched, canines dome-shaped, partial arrest of development at tips. Teeth yellowish, structure excellent, one first molar castellated. The "bite" raised in front; *i.e.*, the teeth do not

meet on closure of the jaws. Patient is a strong, healthy-looking girl with no sunken bridge to the nose.

43. F., 23. K., right, without iritis. Central upper incisors Hutchinsonian, colour and structure of teeth normal. Is one of a family of ten, of whom four died before reaching age of two years. Is herself delicate, pallid-looking, has no sunken bridge to nose, and no scars on face. Is married, has had two miscarriages, and one living child.

44. F., 19. K., and iritis right and left. Upper central incisors slightly peg-shaped, not notched, but grinding down may account for absence of notching. First right upper molar alone castellated. Palate not arched. Bite occludes correctly. Has scars about the chin and a slightly depressed and flattened bridge to nose. Parents dead, brothers and sisters all alive.

45. F., 15. K., left. Left central incisor (upper) notched, but thin lamina of enamel still present. Lower incisors slightly peg-shaped, with marks of arrest of development. Palate slightly arched. No scars on face. Bridge of nose not depressed. Marked raising of "bite" in front towards the left side. History of brothers and sisters dying young.

46. F., 4. K., right and left. Most of temporary teeth decayed. Central incisors (upper) standing obliquely in the characteristic way described by Hutchinson. "Bite" raised in front. Has a syphilitic history. Is the third child. First-born alive and healthy, the second a miscarriage.

47. M., 10. K., right and left. Teeth of arrested development. Of central incisors the right upper and left lower are notched. The boy is small and dwarfed-looking, has a peculiar square forehead, sunken nose, and scars about angles of mouth. An elder brother has healthy, well-formed teeth. The mother has a syphilitic eruption on nose, which yielded to specific treatment, after being unsuccessfully treated as "lupus," for some months, in another hospital.

48. M. Fine healthy boy. Eyes sound. Has peg-shaped teeth, with notched appearance, due to arrested development. Had measles at age of three years.

49. F., 20. Had been under treatment elsewhere for some form of iritis. Teeth in shape very much resembling H. T.

50. F., 14. Eyes not noted. Colour of teeth not peculiar, the "bite" not raised. Mother states that the teeth of first dentition appeared at age of nine months, and dropped out a day or two after appearing, while none of the permanent front teeth made their appearance till after the age of nine years. The mother bore seven dead children. This girl (the eldest) had "snuffles." She has a fairly good bridge to the nose, not markedly flattened. There is slight scarring at mouth angles, and the physiognomy is somewhat "characteristic" to an experienced observer.

51. F., 15. K. right and left, which, in spite of all treatment, ended in complete disorganisation and cicatricial flattening of both corneæ. H. T., the upper central incisors most characteristically peg-shaped, with small notch. Canines not marked. Molars doubtful. Colour of teeth normal. Bite fairly normal. Palate highly arched. Forehead high and square. Nose normal. Slight scars on one side of mouth. Parents dead. Of their children four were dead born.

52. M., 18. K., with iritis left. Teeth not typical, more resembling so-called mercurial (rachitic). Lower incisors normal; upper, slightly peg-shaped, but not in characteristic position. Canines normal. One molar slightly castellated. "Bite" not raised. Palate not arched. No scars at mouth angles. Parents had ten children; four died young. Patient is eldest living.

53. F., 8. Eyes not noted. Has a little dwarfed castellated crown springing from crown of temporary molar, wart-like, similar to those ascribed by Fournier to syphilitic taint. As a baby had convulsions. Family history well known, quite excludes syphilis.

54. M., 11. Eyes normal. So-called mercurial teeth, strongly resembling the true syphilitic. Lower incisors peg-shaped, as is not infrequent in these cases. Upper and lower molars castellated. Canines knobbed. Bicuspids and lateral incisors normal. Upper central incisors notched with laminæ standing, but not peg-shaped, and not in characteristic position. Nose good, no scars, healthy appearance, and family history good.

55. F., 25. K. right and left. Lower incisors slightly peg-shaped; upper incisors worn down; molars castellated;

and "bite" raised to the left. Scars at mouth angles. Nose good. Is married and the mother of two children.

The preceding list contains fifty cases of corneal inflammation, of which two (Nos. 24 and 25) were not when seen considered to be typical cases of diffuse interstitial keratitis. In these two the teeth were normal. In the remaining forty-eight cases Hutchinson's "syphilitic" teeth were present thirty-one times. The teeth were noted as doubtful or suspicious in three cases, normal in seven, and no note at all was taken of their condition in seven cases. In the forty-one cases of diffuse interstitial keratitis where the teeth were examined, thirty-one individuals were found with the typical syphilitic deformity in their teeth, three had "suspicious" teeth, and only seven possessed absolutely normal teeth. Hutchinsonian teeth were, therefore, present in more than seventy-five per cent. of the cases examined, a percentage too large to be explained by the supposition that the association between the two conditions (of eyes and teeth) may be accidental, and as the one cannot be conceived to be the cause of the other, there is no other hypothesis available except that which makes them both different effects of some common cause.

In twenty of the forty-eight cases of keratitis there is other evidence forthcoming of hereditary or infantile syphilis apart altogether from the keratitis or the condition of the teeth. In ten of these cases (Nos. 7, 9, 12, 19, 26, 32, 33, 35, 46, and 47) this evidence is so strong that it amounts to absolute proof. In ten other cases (Nos. 6, 15, 17, 21, 29, 36, 38, 44, 51, and 55) the evidence is weaker, but nevertheless affords such an extremely high probability that few medical men would be inclined to doubt the conclusion, The remaining twenty-eight cases afford no distinct evidence of syphilis, and in many of them it must be admitted that syphilis was probably not present. Others, no doubt, if more carefully examined, and if their family history had been obtainable, would have afforded proofs of lues similar to what were found in the first or second series. Even in the present notes a certain number exhibit characters which are connected with some congenital dyscrasia, very probably the syphilitic, *vide* cases 20, 22, 23, 37, 40, 41. In no one of the twenty-eight cases could it be confidently asserted that parental syphilis had been certainly absent, and the large number of cases recorded without definite evidence one way or the other is unfortunately, but too easily accounted for by the little time available for investigations into such matters as family history when prescribing for a large number of hospital out-patients. The fact of importance is that in more than forty-one per cent. of the cases of diffuse interstitial keratitis more or less satisfactory evidence was found of the presence of hereditary syphilis, and no other cause whatsoever was assignable to the keratitis in the remaining cases.

The age of the subjects of this keratitis varied between four and thirty years, but the notes of this latter case are too scanty to justify a very positive opinion as to the accuracy of the diagnosis (case No. 31). Several undoubtedly typical cases occurred at the age of twenty-seven, and more than twenty-five per cent. were above the age of twenty. Only seven of the forty-eight were below the age of ten. From this experience it is perhaps justifiable to extend the limits of average age given by Mr. Hutchinson (between ten and fifteen) to include the ages between five and twenty-five. Only one case occurred below the age of five, and only five above that of twenty-five. Mr. Nettleship seems to have seen the disease as late as the age of thirty-five, but the oldest patient seen by Mr. Hutchinson was only twenty-five, the youngest two.

Most of the writers upon interstitial keratitis follow Mr. Hutchinson in attributing to the male sex a greater immunity from the disease, but the present series does not bear out that view. Of the forty-eight patients, twenty-four were males and twenty-four females.

So-called syphilitic teeth were present in thirty-two individuals. In nine of these direct evidence either in the person of the patient or the statements of the parents was forthcoming in proof of the existence of a syphilitic taint (cases Nos. 7, 9, 12, 19, 33, 35, 46, 47, and 50). In eight others there was from the history or appearance a strong probability that the patient was the victim of hereditary lues (cases Nos. 15, 17, 21, 29, 38, 44, 51, and 55), while the remaining fifteen afford no evidence one way or the other. In more than fifty-three per cent., therefore, of individuals possessing the peculiar type of dental deformity described by Hutchinson there were other evidences (apart from the state of the eyes) of the existence of a syphilitic taint. Of these thirty-two individuals with Hutchinsonian teeth all except one (case 50) had either diffuse interstitial keratitis or the marks of some similar affection which had existed at some earlier period. These figures are, however, naturally accounted for by the fact that most of the patients were being treated for their eyes at an ophthalmic hospital, and were only transferred to the dental hospital because their eyes were attacked by diffuse interstitial keratitis.

The peculiar dental markings which may be fairly attributed to hereditary syphilis are, to a great extent, limited to the upper incisor teeth. Here the vertical notching is the principal characteristic. It must not be forgotten that this notching may also be found, to a certain extent, in the so-called " mercurial " or "rachitic " teeth, or " teeth of arrested development." These latter teeth, however, do not exhibit the narrowing from side to side of the cutting edge, and do not assume the characteristic position which the syphilitic teeth present, which was described by Mr. Hutchinson " as converging towards each other," and which is figured in the Lond. Ophthal. Hosp. Reports, Vol. II., p. 82.

The syphilitic lower incisors are frequently peg-shaped — a deformity occasionally found also in the so-called mercurial teeth—and often present vertical notches similar to those seen in the upper incisors. One of the series of cases (No. 20) is peculiarly interesting, as it disproves the current opinion upon the formation of these notches in the incisor teeth, viz., that the notch is formed by the breaking or wearing away of a thin lamina of badly-developed tissue. In this case the notches which were present in the lower central incisors of the permanent teeth were coeval with the birth of the teeth, which erupted while the patient was attending hospital.

Castellation, or the occurrence of a little superimposed crown on the masticating surface of the molars, which is noticed by Fournier, is not by any means peculiar to syphilitic teeth, but is found in cases when any interruption to development has taken place, as in case 53, the history of which was thoroughly known, so that syphilis could be absolutely excluded. This child, however, had convulsions in infancy, a fact quite sufficient to account for the existence of a deformity resulting from arrested development. M. Fournier, too, in his monograph on this subject, mentions other defects in the formation of the enamel and dentition of syphilitic teeth, all of which defects are found also in the so-called mercurial teeth, and cannot be regarded as in any way peculiar to the teeth of hereditary syphilis, though, of course, they may be, and frequently are, present in addition to the special syphilitic markings.

The experience obtained by an examination of this series is also opposed to Mr. Hutchinson's statements that syphilitic teeth are of a peculiar colour, and are subject to a peculiar form of black caries. No colour peculiarity has been demonstrable, nor has any peculiar liability to caries been observed. Indeed, the recent investigations into the pathology of caries, so ably conducted by Dr. Miller, of Berlin, and, at the same time, independently, by Messrs. Underwood and Milles, of London, place the whole subject of dental caries in such a different light that Mr. Hutchinson's statement becomes even *a priori* untenable.

The peculiar arching of the palate which has been described occurs in some of the syphilitic individuals, but is so infrequent that very little stress can be laid upon its diagnostic value. A peculiarity is presented by several of the cases here published, to which, hitherto, attention has not been called, viz., a well-marked separation generally towards the left side, which occurs between the front teeth of the upper and lower jaws on occlusion of the jaws.

The general conclusion which appears justified by the observations made in the foregoing cases may be formulated briefly as follows:—Hereditary syphilis is an efficient cause in producing Hutchinson's notched teeth and diffuse interstitial keratitis, and while the doctrine of the plurality of causes, and the impossibility of proving the presence of syphilis in every case alike, forbid the assumption that it is the only cause of these abnormal conditions, it remains still the only one whose presence has been proved, and whose efficiency is undeniable. It cannot, however, be expected, in the multiplicity of physiological antecedents and consequents that every individual affected with hereditary syphilis should exhibit the dental deformity, and suffer from the corneal inflammation. The notorious variability in the occurrence of the well-known secondary and tertiary symptoms is sufficient to condemn any such expectation. The practical inference to be drawn is that even when no other indications advise it, an anti-syphilitic treatment is the correct method of dealing with diffuse interstitial keratitis, and is the practice that will lead to the most successful results.

ISMAR SCHLESINGER (Berlin). On the Pathology of the Retina and Optic Nerve in Bright's Disease. *Berlin*, 1884. *Hermann Peters.*

During the space of five years 43 cases of retinitis or neuro retinitis albuminurica appeared at Professor Schœler's clinic, these being about 19 per cent. of all the patients. Of the 43 cases, 67 per cent. were male and 33 per cent. female. Grouped according to age they were as follows :—

Age.	M.	F.
1—10 years	—	—
10—20 ,,	1	—
20—30 ,,	3	8
30—40 ,,	5	3
40—50 ,,	7	2
50—70 ,,	12	1
Unknown	1	—
Total	29	14

It will be noted that no case occurred during the first decade of life, and only one, namely, a boy of 12½ years, during the second. The majority of the male cases were already over 50 years of age, while the majority of the female cases occurred at the age of sexual maturity.

The etiology of the nephritis could be determined only in 8 cases, all female, and in seven of these the cause was pregnancy, while in the eighth case the cause was scarlet fever and diphtheria. In the remaining 35 cases, *i.e.*, in 81·5 per cent., no cause could be discovered. Premature labour occurred in most of the pregnancy cases, with marked increase of nephritic symptoms.

Ophthalmoscopic appearances and visual disturbances observed in retinitis albuminurica were—(1) Hæmorrhages, typical white patches and diffuse greyish white opacity of the retina in 33 cases (76·9 per cent.) Uniform greyish opacity of the retina was not seen in any case unaccompanied by patches and hæmorrhages. (2) Hæmorrhages with diffuse greyish white retinal opacity, but without patches in 6 cases (13·9 per cent.) (3) Changes extending to the periphery of the retina in 3 cases (6·9 per cent.), without discoverable anyloid degeneration of the kidneys. This Schlesinger specially emphasises, as Stedman Bull has published cases in support of the opinion that such a uniform opaque infiltration of the retina as was present in these cases characterises anyloid degeneration of the kidney as distinct from so-called Bright's disease. (4) Optic neuritis alone was present and always bilateral in 3 cases (6·9 per cent.), slight retinal changes appearing at a later period in two of them. (5) In one case of nephritis with loss of vision the ophthalmoscopic examination gave negative results, the lesion being hemianopsia after apoplexy. In another case there was merely slight pallor of the temporal half of the disc, and the case was probably one of tobacco amblyopia.

Graefe divides the loss of vision in nephritis under three categories—(1) Central vision reduced, peripheral vision normal. In this group fell 23 cases. (2) Concentric narrowing of visual field proportional to the loss of central acuity. In this group there were 10 cases. (3) Peripheral vision irregularly affected, and not in correspondence with central vision. Of this there were 9 cases. Narrowing of visual field was present, therefore, in 19 cases (44·5 per cent.) Five of the cases were complicated by cataract, but Schlesinger considers that the number of his cases is too small to give any substantial support to Deutschmann's assertion that there is a causal bond between nephritis and cataract.

The onset of retinitis albuminurica is very rarely unilateral, and was so in only one of the cases observed by Schlesinger. This case, a female aged 36 years, with symptoms of granular kidney and uræmia, had typical albuminuric retinitis in the neighbourhood of the right macula, with marked loss of vision, the vision and fundus of the left eye being perfectly normal and remaining so. While so seldom unilateral, the retinitis is, however, not seldom unequal in the two eyes. This was the case in 10 patients (23·2 per cent.)

As to the onset of the nephritis, the first noticed symptom could be ascertained only in 27 cases. In 7 cases (26 per cent.) it was loss of vision alone, in 5 cases (18·5 per cent.) there was loss of vision and uræmic symptoms (headache, vomiting, &c., and in three cases palpitation), in 7 cases (26 per cent.) œdema, and in 1 case each eclampsia, sub-conjunctival hæmorrhage, and frequent micturition. Most of the cases were chronic, with evidence of contracted kidney; only in one was there evidence of fresh parenchymatous nephritis, with scanty dark urine and copious deposit. The amount of albumen was copious in 25, scanty in 9 cases, but never rose to the amount present in acute nephritis. Œdema was present in 35 cases (81·5 per cent.), hypertrophy of the left ventricle in 14 cases. Only 6 patients felt quite well; the others had more or less marked symptoms of uræmia, 6 complaining of asthma. In some cases the breath had a urinous odour, readily perceived during ophthalmoscopic examination. In 3 cases albumen was not always present.

The date of commencement of the loss of vision could be ascertained only in 23 cases. In 18 cases (78·3 per cent.) there was a gradual loss of vision, in 5 (21·7 per cent.) extremely rapid loss. In two of the latter cases vision sank so much in 8 days that at the end of this time fingers could just be counted at a few feet. In one case blindness followed after 8 weeks on rapid deterioration, and in another after delivery complete amaurosis followed on a short period of visual failure. Of 17 cases in which the future course of the disease was followed, in 4 vision improved somewhat and then stood still, although in 2 of these cases the nephritis got worse. In 4 cases (23·6 per cent.) vision got worse, in 9 (52·8 per cent.) it improved, but got quite better only in 4 cases where the nephritis also improved. In one case the visual improvement shortly preceded death. In the greater part of the cases the visual loss relapsed quickly. Blindness occurred only in 2 cases, and that shortly before death.

Death followed, so far as known, in 9 cases, and shortly (that is a few days to half a year) after the first examination. In 3 cases death was quite sudden. And generally, Schlesinger notes, his experience confirms the opinion that the prognosis of retinitis albuminurica is *quoad visum* not so bad as it is *quoad vitam*.

Bunge (Halle). **Injurious Effects of Cocaine upon the Cornea.** *Klin. Monatsbl. f. Augenheilkunde. Sept.*, 1885, *p.* 402.

Pfluger (Berne). **Cocaine.** *Centralbl. f. prakt. Augenheilk., July*, 1885, *p.* 206.

L. Bellyarminoff (St. Petersburg). **Unfavourable General Effects Produced by the Local Application of Cocaine to the Mucous Membrane of the Eye.**

The uses and advantages of cocaine have become known so rapidly to all ophthalmic surgeons, and have been set forth in such ample detail in the current literature of the last twelve months, that it has seemed superfluous to review the subject in these pages. It may be useful, however, to gather together a few notes of cases in which the employment of the new drug has been attended with unfavourable and even serious symptoms.

Bunge relates that in the clinic of Graefe at Halle the application of cocaine has apparently been the cause, in a few cases, of mischief to the eye. This was of three kinds, viz., destruction of the corneal epithelium, vesicular eruption on the cornea, and parenchymatous changes with considerable opacity in the corneal tissue.

In the cases of three elderly persons, about to be operated on for senile cataract, the use of a three per cent. solution at short intervals during a period of fifteen minutes was found at the moment when the operation was to have begun to have caused a destruction of epithelium in the central area of the cornea. The denuded surface, like that which still retained its epithelium, was perfectly transparent and devoid of sensibility. The operation in each case was deferred, and the epithelium was regenerated in the course of a day or two. In one of these cases it was noted, a few hours after the use of the cocaine and during the healing process, that the whole cornea had become slightly hazy, and that the conjunctiva of the lower half of the globe and of the lower lid was much injected, chemosed, and covered with secretion.

There could be no doubt that the mischief in question was due to the cocaine. The corrosive sublimate solution (1 in 5,000) which is systematically used in this clinic to cleanse the conjunctival sac prior to operating has never been found to affect the cornea. All three patients ultimately were afterwards operated on with good results.

In another case, that of a vigorous man of 60, the cocaine produced no immediate ill effect ; but on the sixth day, when the cornea was inspected for the first time after the operation, its lower two-thirds was found to be covered with fine vesicles, most numerous below in the neighbourhood of the incision, and diminishing in number in the upward direction. A more accurate examination in the middle of the second week showed that the vesicles had somewhat increased in size, and that some of them had burst ; the sensibility, both in the vesicles themselves and in the interspaces, remained somewhat subnormal. The conjunctiva was not more injected than is usual at this period. The tension, tested on the eighteenth day, was slightly subnormal. Not until the fifth week did the condition of the cornea decidedly improve, and at the end of the sixth week V. with correcting glass was Sn. C. at 5 feet.

In six other cases a still more serious complication arose, namely, parenchymatous opacity of the cornea, manifesting itself by vertical lines passing upwards from the region of the wound where they were most dense, and disappearing near to the upper margin of the cornea. They appeared to be of the same nature as the opaque streaks which may usually be traced from the incision a short distance into the substance of the cornea, but of greater density and extent. The surface of the cornea showed numerous slight irregularities in the form of elevations and depressions, not amounting, however, to a formation of vesicles. The sensibility of the cornea usually remained somewhat impaired and the tension slightly reduced. There was no unusual pain or tenderness, lachrymation, or conjunctival discharge. The ill effect lay in the impairment of vision, and this in some at least of the six cases in question (in a total of 150 operated upon) was so pronounced that the opaque cornea hardly admitted more light than the opaque lens had previously done.

Pflüger, in an article on the various properties of cocaine, states that in his experience the drug is not in all cases harmless ; that a two per cent. solution may, under certain circumstances, abolish the sensibility of the cornea for much longer than the desired time, and may in this way induce serious disturbance of its nutrition. In the case of a very senile subject, aged 67, he made a cut with de Wecker's scissors through a membrane occupying the pupil after cataract extraction. The wound healed perfectly, and the aperture remained black and clear. At the first dressing on the fifth day the eye showed no sign of irritation. Two days later pain and circumcorneal injection began, and a typical neuro-paralytic keratitis quickly developed. Cornea and conjunctiva were found completely insensible, and the tension greatly reduced (T – 3). The cornea showed vertical stripes of opacity, suggesting that Descemet's membrane was thrown into folds. Regarding the anæsthesia as the cause of the opacity, Pflüger endeavoured to excite the paralysed nerve fibres by means of the constant current, placing the cathode directly upon the cornea, the anode on the neck. The current from six small elements was borne without reaction; after three applications the cornea recovered sensibility, and it became necessary to place the cathode over the closed lids. On the twentieth day after operation the patient was discharged with a clear pupil and a nearly clear cornea, the vertical folds being much less visible. The tension had increased but remained subnormal (T – 1). It was noted that the fellow eye, not operated on and not treated with cocaine, had also subnormal sensibility and subnormal tension, though in much smaller degree, and from this Pflüger concluded that the continuous pressure of the bandage may have been partly to blame for the untoward symptoms. He points out that the occurrence of such a neuro-paralytic keratitis during complete occlusion with the bandage strongly favours the theory that the corneal changes are directly due to the loss of the trophic action of the trigeminus, and not to exposure to external influences. He utters a caution against giving cocaine solutions to elderly and feeble persons for home use away from medical supervision.

It is unnecessary here to analyse the theories which are maintained with regard to the precise nature of the action of cocaine. While some writers, with Pflüger, attribute the anæsthesia to the direct action of the drug upon the terminal fibres of the fifth nerve, others, and notably Eversbusch (Centralbl. f. prakt. Augenheilk., Oct., 1885, p. 289), point to the contraction of arterioles and resulting capillary anæmia, as being probably the essential cause of the loss of sensation. The practical point to which we draw attention is, that the nutritive activity of the parts affected is for the time being lowered, and that where this is already feeble, as in debilitated and aged persons, the free use of cocaine involves some risk to the vitality of the tissues.

A second kind of risk, to which attention has been drawn by several writers, is that of a general toxic effect. In the paper referred to at the head of this notice, Bellyarmionoff cites several recorded examples as well as three fresh ones of his own. Thus Knapp has seen two cases in which the introduction of from 0·3 to 0·36 grammes of a four per cent. solution of cocaine produced prostration, pallor, cold perspiration, and thirst. Peck observed, after the use of cocaine, marked pallor of the face in a lady on whom he performed tenotomy. Stevens gives a case where the application of 0·5 gramme of a four per cent. solution of cocaine produced convulsions and loss of consciousness in a healthy male subject; and another where a patient, after the application of twelve drops of a four per cent. solution to the conjunctiva, became pale and faint, and was covered with cold sweat; though on a repetition of the application on a subsequent occasion no similar symptoms were observed; the author's explanation of which is that in the first instance they were not really due to the cocaine but to a nervous dread of the operation. Mayerhausen states that a little girl of twelve years of age complained of headache, irritation of the neck, and nausea, her face becoming pale and her speech indistinct after the application of fifteen drops of a two per cent. solution of cocaine.

Reich has recently published two similar cases: one of a little girl of 10, who for a whole day after the instillation of from twelve to fifteen drops of a two per cent. solution for an operation for artificial pupil, was pale and faint and suffered from nausea and vomiting. The other of an old woman of 60, who, after the use of from eight to ten drops of a two per cent. solution, suffered from faintness, trembling of the limbs and vertigo, and was covered with perspiration.

The fresh cases reported by the author occurred in the clinic of Prof. Dobrobolski in St. Petersburg. The procedure adopted there was as follows:—Previous to operation two or three drops of a four per cent. solution of muriate of cocaine (from Merk of Darmstadt) were instilled into the eye three or four times, at intervals of from three to five minutes; the whole conjunctiva was then washed with a solution of corrosive sublimate and the cocaine again dropped in and repeated during the operation, according to the appearance of sensibility. This method was followed exactly in the following five cases:—

1.—Mrs. A. D., aged 41, badly nourished, and with history of syphilis. Iridectomy was performed on left eye. Two hours after the operation she complained of a violent pain in the eye, with general prostration, nausea, and vertigo. An hour later vomiting commenced and continued nearly all night, not being checked by swallowing bits of ice or by morphia. In the morning, after a few mouthfuls of wine, the vomiting ceased, as also all the other unpleasant effects of the cocaine. The corneal wound healed satisfactorily in two days.

2.—Mrs. E. M., aged 73: badly nourished. In both eyes ripe senile cataracts. Graefe's extraction performed on right eye. An hour and a half afterwards she complained of pain in the head, chest, and extremities, with general weakness, vertigo, and nausea. After two hours vomiting began, and recurred four times in the course of two or three hours, with meteorism and perspiration. Swallowing bits of ice and morphia gave no relief. Wine was given and improvement followed. Next morning all unfavourable symptoms had disappeared. The corneal wound did not heal for three days. The ultimate result was satisfactory, $V = \frac{20}{70}$. Five weeks later the cataract of the left eye was removed. This time a weaker, viz., a two per cent. solution of cocaine was used and less plentifully, three drops only being applied once before the operation, and once during its progress. No ill effects were produced.

3.—M. E., 70, a soldier's wife. Nutrition bad. In February, 1884, the left lachrymal sac had been obliterated by means of the thermo-cautery under chloroform, and in March the right eye had been operated on for cataract without chloroform. No complications followed either of these operations. On February 1st, 1885, the left eye was operated on for cataract under cocaine. This was followed by vertigo, general debility, with tremor of the hands and knees. Vomiting then came on and continued throughout the night. The cornea did not heal for three days. There was also traumatic keratitis. The ultimate result was satisfactory, $V = \frac{20}{50}$.

Cases 4 and 5 did not differ appreciably from the foregoing. The patients were women of 67 and 73; badly nourished. The after-effects were the same as those previously mentioned, with retarded healing of the corneal wound, traumatic keratitis, &c. The ultimate results were, however, satisfactory.

The author draws attention to the fact that in each of these five cases the patient was in a very badly nourished state, and that the same group of symptoms occurred in all, viz. :—prostration, vertigo, perspiration, vomiting, and meteorism, occurring from an hour and a half to two hours after the operation, in some instances accompanied by pains in different parts of the body and tremor of the limbs. Further, there could be no doubt that the symptoms were referable to the cocaine. In order to guard against such results in future, a two per cent. solution is now systematically employed, and the number of drops to be used is carefully defined. Since these precautions were taken, no untoward effects have been observed.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, October 15th, 1885.

Thomas Simpson, F.R.C.S., Vice-President, in the Chair.

Double Coloboma of Eyelid.—Mr. Lang showed a case of double coloboma of the right upper lid in a boy aged 12. One fissure was in the centre of the lid; the other was one centimetre to its inner side. The piece of lid intervening contained normal lashes and Meibomian glands. Closure of the fissures restored the lid almost to the normal state. The cornea had suffered somewhat before the patient was operated on.

Changes in Optic Discs persistent Ten Years after Accident.—Mr. Brudenell Carter showed a case in which, after a railway collision, in January, 1876, there was amblyopia, with loss of accommodation, and decided diminution of the size of the vessels of the disc, especially of the arteries; the pallor of the surface of the disc was marked. The condition had remained unaltered, and was the same now as it was ten years ago. The patient had lost colour-sense. He possessed about one-fifth of normal vision when hypermetropia 2 D was corrected. He was one of Gillow's decorators, and could hardly distinguish different shades of colours.

Persistent Hyaloid Vessels.—Mr. Brudenell Carter also showed a case in which the persistent remains of the hyaloid vessels had been mistaken for a morbid flocculus.

Corneal Pigmentation by Aniline.—Mr. J. G. Mackinlay showed a man, aged 44, who had been employed in aniline dye works for seven years, working ten hours and a half daily. The cornea and conjunctiva were deeply stained by a brown dye. The iris could only be seen with difficulty. The head and beard were dyed a red-brown, and the skin of face, neck, and hands of the same colour. There was no albuminuria. He could name green, blue, or black colours, and matched wools fairly well.

Tubercle of Choroid.—Mr. J. B. Lawford read notes of some cases of tuberculosis of the choroid, and exhibited specimens of the bacillus tuberculosis in the nodules of the choroid. Four eyes had been examined, obtained from cases of general tuberculosis, and in all tubercular meningitis had been present. In three of the cases the bacilli were found in the choroidal tubercles; but, in the fourth case, careful and repeated examination failed to detect them, though, in this case, the rods were easily and abundantly discovered in the meninges about the chiasma. The specimens were prepared after the Weigert-Ehrlich and Gram methods; the latter was found, on the whole, preferable.

Peritomy for Granular Lids.—Mr. Spencer Watson showed a case of granular lids and rough vascular corneæ treated by peritomy, with partially successful results. The patient was a woman, aged 22. The right eye was operated on in May, and the left in July last. The improvement was but partial in both eyes, the corneæ having become somewhat clearer and less vascular, but the palpebral mucous membrane remaining as rough and granular as before the operations.

Mr. Anderson Critchett thought that Mr. Watson had exaggerated the late Mr. G. Critchett's opinion, which was that, in many cases, peritomy sufficed without other treatment: in others, it was necessary to treat the granulations after peritomy. If a considerable power of constitutional repair were present, then the tight cicatrix necessary for the complete cure would be formed, but this frequently failed to occur in strumous subjects. No doubt, in some cases, the treatment by jequirity was sufficient.

Mr. Nettleship said that in his hands peritomy had, in some cases, given brilliant results. In one case in which he had freely used jequirity, the subsequent performance of peritomy was followed by a most satisfactory result, the cornea becoming almost perfectly clear.

Orbital Cellulitis.—Mr. Anderson Critchett read a paper on a case of orbital cellulitis. The attack occurred in the spring of 1884, and the patient, a young lady, aged 15, was transferred to Mr. Critchett by Sir William Bowman. There was marked proptosis of the right eye, with considerable chemosis, accompanied by severe orbital and frontal pain; the pupil acted sluggishly, and the media were so hazy that no view of the fundus could be obtained. The temperature was 100° Fahr., and there had been a slight rigor. The patient was placed under an anæsthetic, and a free incision was made through the right upper lid into the orbit. Sero-sanguineous fluid escaped copiously, but no pus; no tumour could be felt. The deep-seated pain ceased, but the proptosis continued. Ten days later, the sight of the left eye, which had hitherto been excellent, became affected, so that in the course of a few hours the patient could barely count fingers, while simultaneously there was a marked improvement in the vision of the right eye. In thirty-six hours, the sight of the left eye was again normal, and the right eye had relapsed. These alternations continued at intervals of about four days during the next fortnight, when the proptosis of the right eye increased to an alarming extent; after a consultation, at which Sir William Jenner, Sir William Bowman, Mr. Hutchinson, and Mr. Critchett were present, it was decided that Mr. Critchett should make fresh incisions into the orbital cavity without delay. At the operation it was found that a portion of the lachrymal gland had been forced downwards to the external canthus, and the incisions were followed by a considerable escape of serum, but no pus. From the date of the second operation, the patient made a slow but steady recovery, but for some weeks the curious alternations in sight continued. At the present time, she has entirely recovered the sight of both eyes. The cause of the attack was very obscure; there was no specific history, but one very curious fact was observed: the teeth were almost devoid of enamel, and an experienced dentist stated that eleven of the second teeth were uncut. A few months back, the right eye again became dim, but the sight rapidly cleared when a painful tooth was extracted. The left eye was not affected.

Dr. McKeown narrated a case in which an ocular lesion rapidly improved after the wisdom-teeth had been cut.

Intracapsular Injection of Water in Cataract Extraction.—Dr. W. A. McKeown read a paper on the intracapsular injection of water in the extraction of cataract. His method consisted essentially in the substitution in the operation of extraction of a washing-out of the cortex for the pressing, rubbing, and scooping out. His method of operating was as follows. He made the small flap section of the cornea above with puncture and counterpuncture in the sclero-corneal margin, and cut out about half a line from the corneal margin. He always performed iridectomy. After lacerating the capsule freely and expelling the lens, if any cortex were left behind he introduced a perfectly clean "scoop syringe" well within the capsule, and gently injected distilled water of the temperature of about 100° Fahr., making gentle motion at the same time with the scoop to facilitate removal. He had now used the scoop syringe in all thirty-nine times. In one case only was there irido-choroiditis, with complete closure of the pupil; good perception of light was retained. In another case, there was most insidious iritis, beginning after the patient's discharge from the hospital; it went on to closure of the pupil, but there was a good prospect from iridectomy. In the case of a syphilitic subject, there was a severe iritis arrested by artificial leeching and mercurial inunction. In no case was there suppuration of the eye or of the cornea, and in no instance was there escape of vitreous from the use of the syringe. Even in two cases of traumatic cataract, the syringe was used with advantange, notwithstanding the previous escape of vitreous. In a few cases, some iritic adhesions formed, as commonly occurred in ordinary cataract operations, but caused no pain or diminution of vision. In twelve cases the cataracts were unripe, and in several the cortex was very sticky. In the last thirty cases he had had only one inflammation, and that was in the case of the syphilitic subject above referred to. There were two cautions to observe: first, after iridectomy, to get the blood out of the anterior chamber as quickly as possible; secondly, to be careful to introduce the scoop within the capsule. He did not believe in operating against time, but there could be no doubt that the quicker the work could be done and the eye bandaged, the better. He timed the duration of the last eleven operations from the introduction of the speculum to the application of the bandage. It varied from six to fifteen minutes, the average being about nine minutes. The operations were all done without chloroform, and some of the patients were restless. The conclusions which he thought he might draw from his own experience were: (1) that the judicious injection of water within the capsule of the lens was innocuous; (2) that it was not liable to cause loss of vitreous; (3) that it was advantageous both in ripe and unripe cataracts; (4) that it shortened the average duration of cataract operations; and (5) that it was a most efficient means of clearing the wound.

Mr. McHardy thought that the method might be used for ripening immature cataract, and to facilitate the removal of cortex at the time of extraction. The method of trituration as advocated by Förster, the extraction being preceded by preliminary iridectomy, had been, in his hands, followed by no disagreeable results. He had, however, noticed a loss of vitreous, which he was not accustomed to see when the lens had matured spontaneously. Posterior synechiæ could be broken down at the time of operation. There might be danger and difficulty in getting the nozzle of the syringe within the capsule. The capacity of water to remove the cortex was well known, and if he had to deal with a "sticky" cortex, he usually took the speculum out, closed the lids, and allowed the aqueous humour to be secreted into the open capsule ; then, manipulating with the spoon, it was not at all difficult to remove the cortex after the aqueous humour had acted on it.

Mr. Mackinlay inquired whether Dr. McKeown used cocaine. He thought the nozzle of the syringe was rough, and might be improved upon.

Mr. Critchett mentioned that M. Panas, of Paris, irrigated the anterior chamber in cataract extractions, but the stream was produced by an assistant.

Mr. Adams Frost asked whether the method could be employed for lamellar cataract. It seemed to him to be a sound surgical procedure, and preferable to the use of the scoop or manipulation.

Dr. McKeown, in reply, said that he did not employ the method in simple cases. He had not had any trouble with the instrument. The operator should get the instrument in behind some of the cortex of the lens. He did not see why it should not be employed in lamellar cataract. He now always employed cocaine.

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NOTE ON THE VALUE OF THE THERMO-CAUTERY IN THE TREATMENT OF SLOUGHY ULCERATION OF THE CORNEA.

By J. Crawford Renton, M.D., Ed.,

Surgeon to the Eye Infirmary and Surgeon to the Dispensary of the Western Infirmary, Glasgow.

For the last year I have regularly used the thermo-cautery in certain forms of sloughy ulceration of the cornea, and have found the results most satisfactory.

The cases in which the cautery is of greatest benefit are those in which an injury is the cause of the ulcer, and where it is beginning to spread in the layers of the cornea, an onyx or small hypopion having formed. When the hypopion occupies one third of the anterior chamber, paracentesis is necessary in addition to the cautery; but should it be greater, then incision by Saemisch's method or sclerotomy have yielded me the best results.

Cases which have been carefully treated with antiseptic solutions, atropine, and rest, have not improved until the cautery was applied, after which healthy action was set up, and the ulcers soon healed. In applying the cautery it is necessary to be careful not to allow its action to go too deeply, otherwise the result will not be so good, a superficial destruction of tissue being all that is required to arrest the sloughing process.

So satisfied have I been with its effects that I feel that it cannot be applied too early, and even in cases not traumatic I have been pleased with its controlling effect on the advance of the sloughing process, as also with the small cicatrix which is left. Its use in weak ulcers associated with granular ophthalmia has been attended with the best result, while its application to certain forms of the latter distressing complaint is found of distinct value.

The instrument I have employed is a cheap form obtained from Mr. Gardner, 45, South Bridge, Edinburgh ; it has never failed to act, nor have I had any trouble with it, which is often the complaint brought against such cauteries, so that I have no hesitation in strongly recommending it as being portable, easily worked and applied, certain in its action, and with little trouble maintained at the same heat as long as is required.

TRANSIENT ASTIGMATISM DUE TO PARALYSIS OF OCULAR MUSCLES.

By Priestley Smith.

Mrs. K., aged about 30, a widow lady, was brought to me for consultation, by her brother, a medical man, on August 26th, 1885. Five or six days previously, after a ride on horseback which had caused profuse perspiration, and had probably been followed by a chill, she was seized with violent pains in the head of a neuralgic character. The pain was subdued by large doses of quinine, but as it subsided double vision came on, and it was found that the movements and the vision of the right eye were impaired. This condition had existed for three days before I saw the patient.

With the exception of the disorder above named, the appearance of the patient was that of a vigorous and healthy woman. There was, however, a history of sub-acute rheumatism. She was extremely fond of horse exercise, but always perspired profusely after riding, and had trouble in getting her hair dry under these circumstances. On the occasion in question the attack appeared to be brought on by the cooling of the head.

On examination, an ocular paralysis of unusual kind was found to be present, the internal and external recti of the right eye being totally paralysed, while the other ocular muscles were intact; thus, horizontal movements inwards and outwards were lost, while movements upwards and downwards were retained; there was no ptosis, and the pupil was active and equal in size to its fellow. The eye was not pushed forwards. The diagnosis which these conditions appeared to indicate was that of some inflammatory or congestive change of a rheumatic nature near to the apex of the orbit, and affecting only the sixth nerve and the branch of the third, which supplies the internal rectus.

Mrs. K. remarked that not only was there double vision, but the vision of the right eye was impaired. The ophthalmoscope showed no change in the media or fundus, but with the "shadow-test" I at once detected a slight myopic astigmatism in the vertical meridian, and, on correcting this with a cylinder, 1 D., axis horizontal, obtained an acuteness of vision very nearly normal, and very nearly equal to that of the fellow eye, which had absolute emmetropia and normal vision. This I erroneously took to be a proof that the eyes were naturally of unequal refraction, and I explained to the patient that such inequalities are frequently overlooked until some special reason arises for testing the two eyes separately.

Treatment by salicylate of soda and iodide of potassium, together with a silk handkerchief over the eye and temple, was prescribed, and a week later I saw the patient a second time.

Both the inward and the outward movements of the eye were now partially re-established, and the "sight was better." Examined again by the shadow-test; the right eye, previously astigmatic, showed no trace of astigmatism. Its acuteness of vision was normal, like that of its fellow, and was lessened by the cylinder which had previously raised it. The patient ultimately made a complete recovery.

There can be little doubt that the astigmatism in this case was due to a temporary distortion of the cornea, produced by the paralysis of the muscles corresponding with the horizontal meridian of the globe. We know that an eyeball softened by disease may be greatly changed in form by the action of the external muscles, and it is not unreasonable to suppose that a globe of normal tension may be slightly affected in the same way. Loss of tonicity in the muscles of the horizontal plane would permit the muscles of the vertical plane to compress the globe slightly in its vertical diameter, and to extend it in its horizontal diameter. This would produce a slight flattening of the cornea in its horizontal meridian, supplemented by a slight increase of curvature in its vertical meridian, a change corresponding exactly with the conditions observed. I do not know whether an astigmatism produced in this way has been observed by others ; it must certainly be rare, because a paralysis affecting one pair of muscles and sparing the other pair, in the manner in question, is rare. It suggests the possibility that a want of symmetry in the original development of the muscles may be one of the causes which determine an astigmatic asymmetry in the development of the globe.

Since the above was in type I have, curiously enough, met with a case which is to some extent the counterpart of the foregoing. The patient, an elderly woman, suffered several months back from a " stroke," with loss of speech, dropping of the left eyelid, squint, &c., probably complete paralysis of the left third nerve. At the present time the left internal and external recti act normally, or nearly so, while the superior and inferior recti are totally, or almost totally, paralysed. With the previous case in mind, I examined this patient very carefully, with the shadow-test, for astigmatism, but though a very slight astigmatism was discoverable in each eye, there was no want of symmetry between the two eyes, which could be attributed to the paralysis.

This negative observation does not, of course, invalidate the former one ; it suggests that the two cases differed in some respects not at once apparent. Possibly the degree of paralysis, *i.e.*, the loss of tonicity in the muscles, was more complete in the one case than in the other. The lesion in the first case was probably quite peripheral ; in the second, deeper. That complete paralysis is necessary for the production of the result in question was shown in the former case by the disappearance of the astigmatism, when the first signs of returning power in the muscles occurred. Possibly the different ages of the two patients might imply some difference in the elasticity of the tunics. Possibly the muscles in the horizontal plane exercise normally a greater pressure upon the globe than those in the vertical.

GALEZOWSKI (Paris). Occlusion of the Corneal Wound after Cataract Extraction by Means of Gelatine.

Recueil d'Ophtalmologie, October, 1885, *p.* 577.

Galezowski proposes a novel method of banishing from practice the disasters due to suppuration which, in spite of scrupulous care and the employment of ordinary antiseptic measures, are still occasionally met with after operation.

Finding himself unable to explain these accidents by reference either to general hygienic conditions, the state of the atmosphere, or the constitution of the patient, and following faithfully the teaching of Pasteur, that suppuration can only occur as the result of an infection of the wound by micro-organisms, he was seized with the idea that such organisms may exist in the tears, and that under certain pathological conditions they may multiply, and, coming in contact with the corneal wound, may be the cause of suppuration. One of his pupils, M. Salterain, undertook to investigate the matter with the microscope. The examination of fresh tears gave no positive result, but by mixing a drop of the secretion (how obtained is not stated) with a suitable organic fluid in a cultivation flask, crops of micrococci were obtained in eleven out of fourteen experiments. Inoculations with these cultivation liquids gave no results in the eyes of rabbits or in the human eye. The conclusion arrived at is, that micro-organisms exist even in healthy tears unmixed with conjunctival secretions, but the experimenters prudently confess that their observations require repetition and control.

The carbolic acid spray, followed by antiseptic dressings of carbolic acid, boracic acid, and corrosive sublimate, having failed to entirely banish suppuration, Galezowski proposed to himself to protect the lips of the incision from the septic influence of the tears by placing directly upon the wound a film of some non-irritating substance. Lamels of gelatine half a millimetre thick and 1·5 centimetres square, coated on both surfaces with cocaine, and containing a small proportion of corrosive sublimate, were prepared for the experiment. The corners of this film of gelatine are cut off, and one side is slightly notched; then being moistened with warm water it is placed upon the eyeball so as to completely cover the wound and cornea. The lids are closed over it with a compressive bandage.

The results have so far been excellent. The method has been employed in nineteen cases of cataract extraction, one of iridectomy for corneal ulcer, and one of operation for conical cornea. All the incisions healed well and rapidly, including one case of extraction complicated by chronic suppuration of the lachrymal sac. The lids being opened for the first time at the end of forty-eight or seventy-two hours, no trace of the gelatine film remained. Complaints of pricking and discomfort during the first hour or two were heard in a few cases, and in others there were sensations of heat and fulness during the first night, but in none was it necessary to interfere with the bandage.

Galezowski bespeaks further trial of his method, not only in cataract extraction, but in cases of wounds, burns, and ulcers of the cornea and conjunctiva.

STOOD (Cologne). On the Pathology of Amblyopia Saturnina. *Von Graefe's Archiv.*, 1884, *XXX., iii., p.* 215.

Stood commences with an account of the literature of the subject, referring first to the twelve cases recorded by Tanquerel des Planches, nine of which recovered, mostly in about eight days, while the other three died in two to six days. The autopsies in these fatal cases gave negative results, a not unfrequent fact, we believe, in acute plumbism. Leber classifies amblyopia saturnina into—(1), Cases of sudden bilateral blindness, leaving bare light perception, with but slight ophthalmoscopic changes. These cases generally recover completely; they have much resemblance to uræmic amaurosis, and probably depend on a specific action on the nervous system of lead, accumulated in the body by temporary renal failure. (2), Cases of gradually increasing amblyopia, with central scotoma, contraction or sometimes normal condition of visual field, and hyperæmia of papilla and retina. (3), Cases of sudden or gradual neuritis, which always ends in amaurosis; and (4), Cases resembling retinitis albuminurica. Förster considers that the affection of the optic nerve is the cause of the amblyopia, and that this affection is not in all cases due to albuminuria. Hirschberg, among other cases, publishes one in which, with almost normal ophthalmoscopic appearances, or at most only retinal hyperæmia, $V=\frac{15}{70}$ and $\frac{15}{100}$; and Sn. V. at 5″. Red was called green and green yellow; blue was correctly recognised, but only over 10°. The visual field was contracted on the right to 20° to 30°, on the left 15° to 20°. Result unknown.

Stood then gives the following cases at length :—

Case 1.—A clerk, aged 37 years, having lost his situation, entered, in April, 1882, a white lead and vermilion factory. Formerly quite healthy. In May, 1882, he became constipated, had headache and colic, then general pain in joints and muscles, and in July he left the factory. In August his arms got weak, and his writing uncertain. There was no history of alcoholism. In the end of August his distant vision failed, and latterly his near vision also got progressively worse. In January, 1883, when he came under observation, he was emaciated and cachectic, with blue line on the gums, atrophy of the forearm extensors, and general loss of sensation. The urine contained no albumen or sugar. Vision $R=\frac{6}{6}$, $L=\frac{6}{12}$. Light perception R 7° L 9° as measured with Masson's disc. Qualitative colour vision normal. Pp. 9″. Visual field for white contracted on all sides by about 20°, and for other colours proportionally. In the periphery of the field there was a zone in which a white object, moved centripetally, was seen first as a "dark movement," then as grey, and finally as white. This zone was about 15° to 20° all round. There was a similar zone for other colours;

green, for example, being recognised first as a movement, then as grey, yellowish, pale yellow green, finally as green at 10°. There was nothing abnormal in the eye itself.

The treatment ordered, but not followed out by patient, was potass-iodid, fresh air, and a milk diet. He continued to attend. Vision and light perception getting slightly worse, the zone above referred to persisting.

Case 2.—A painter, aged 31 years, who had been a white-lead worker for a year and a half, had noticed his vision getting bad for three months. He had had symptoms of plumbism for a year. No albumen in urine. The vision was $R=\frac{6}{18}$, $L=\frac{6}{12}$. Qualitative colour vision normal. Light perception 10°. Accommodation extremely defective. Schweigger 0·6 at 8″ with difficulty. Visual field for white nearly normal; for colours much contracted. A zone, similar to that described in Case 1, was present here also.

The treatment was potass-iodid with $+\frac{1}{24}$ for near work, fresh air, and milk diet. Twenty days later vision and accommodation, light and colour perception, and visual fields were normal. The treatment was continued for twenty days longer, when the patient was discharged, no trace remaining of the zone of relative scotoma.

Case 3.—A foreman, aged 31 years, in a wire rope factory, in which much lead was used as a plating, had noticed his near vision getting progressively worse for half a year. His general health was excellent, there was no blue line or constipation. There was no abuse of alcohol or tobacco. No ophthalmoscopic change. Distant vision was practically normal. Light perception 7°, on both sides. Qualitative colour vision normal. Schweigger 0·3 at 8½″. Slight contraction of the visual fields, with the same zone of relative scotoma for white and colours above referred to.

The case was suspected to be one of lead poisoning and Heurteloup was ordered on each side with potass-iodid. In five days the V. was $\frac{6}{5}$, with light perception 3°, and normal visual fields and the zone of relative scotoma scarcely perceptible. He was told to continue potass-iodid and avoid lead, but five weeks later he returned with headache, slight blue line, vision $R = \frac{6}{5}$, $L = \frac{6}{6}$ nearly. Light perception R 4°, L 8°, Pp 8″ (Schweigger 0·3). Qualitative colour vision normal. Right visual field normal, only the red and green limits somewhat contracted. In the left field a relative *ring scotoma*, externally between 30° and 40°, internally between 20° and 30°, and above and below between 18° and 25°. In the area of this scotoma white was seen as grey and blue only just recognised. The peripheral limit for blue was more than normally extensive. The red and green limits lay internal to the scotoma. The limits of the visual field for white were normal. He had the same treatment and the same result followed—that is, complete recovery. He again returned to his work and again with similar consequences.

Case 4.—A foreman in same factory with Case 3, aged 52 years. Had noticed his vision getting defective for a year; he had long been unable to read or write. He was cachectic in appearance, with evidence of chronic lead poisoning. The ophthalmoscope showed refraction + 1 D, both papillæ redder than normal; the veins full and tortuous, thrice the size of the normal arteries. $R=\frac{6}{18}$ c + 1 D.; $L=\frac{6}{18}$ nearly c + 1 D. Almost complete paralysis of accommodation. Light perception R. and binoc. 60°; L. 70°. Qualitative colour perception normal, except for green. Visual fields much contracted, especially for colours. Zone of relative scotoma as in the other cases. Patient did not come under treatment.

All these five cases (including Hirschberg's) belong to one group, characterised by chronic onset of symptoms, with gradual loss of vision; concentric narrowing of visual fields. The relation of the light and colour perceptions, with the asthenopia and ophthalmoscopic results. Hirschberg's case and Case 4 are only a further stage of the others, and suggest a retrobulbar neuritis.

Samelsohn, Nettleship, and Vossius have shown that the fibres for the macula and its neighbourhood lie in the centre of the optic nerve at the optic foramen. Nearer to the eyeball they approach the temporal surface of the nerve, till just before the entrance of the central vessels they lie quite on the temporal side as a rounded cord. From this point the fibres run in the nerve as a wedge-shaped band, cutting edge to the centre of the nerve, base outward. Vossius, following these fibres centrally, finds that in the chiasma they lie on the floor of the optic groove, and then in two strands on the under and on the upper external surfaces of the tracts respectively. Jatzoff has, by anatomical preparations, shown that the part of the optic nerve lying externally just in front of the chiasma supplies the external part of the retina, and that these fibres are separated upward and downward by the macula fibres.

Samelsohn has shown that in central retrobulbar neuritis there is a gradual passage from absolute scotoma to perfect sensitiveness, and considers this a functional characteristic of fresh neuritis. In all five cases above recorded there was marked contraction of visual field, and in the four observed by Stood a peripheral zone in which white was perceived first as a mere movement, then as grey, and lastly as white. He considers himself justified in inferring that in all these cases there was a retrobulbar neuritis affecting the peripheral fibres of the nerve, and proceeding perhaps from the sheath of the nerve. Also this neuritis is to be sought posterior to the entrance of the central vessels, otherwise it would have affected the macular fibres which anteriorly lie at the periphery. The most probable point is at the optic foramen. The inflammation may remain entirely retrobulbar, or by pressure on the retinal vessels cause hyperæmia and congestion. If the inflammation advance towards the centre of the nerve, while at the same time the peripheral inflammatory products are absorbed, the result is a ring scotoma, such as occurred in Case 3.

As would be expected in the supposed neuritis colour vision is affected late, and the first affected is the perception of green, but that only with $V = \frac{6}{18}$, and in Hirschberg's case perception of blue was retained with $V = \frac{15}{100}$. Light perception was defective in all these cases in proportion to the contraction of the visual field, a result agreeing with other observations made by Jacobson and Samelsohn in cases of disease of the optic nerve.

Stood therefore makes the diagnosis in these cases of peripheral retrobulbar neuritis a condition which the pathology of plumbism shows that lead is competent to set up, *e.g.*, in the musculo spiral nerve. The asthenopia he considers due to exhaustion of the ciliary muscle, which comes next to the heart in muscular task. He notes that it seems strange that alcohol should set up a central neuritis, lead a peripheral neuritis, both acting by way of connective tissue formation. Treatment gives a good result while the inflammation is still active, without formation of connective tissue.

Case 5.—A saddler, aged 30 years, after eight weeks' work in a white-lead factory, had an attack of colic, and two weeks later a second. Two months afterwards he became suddenly unconscious in the factory, was confined to bed for three months with symptoms of chronic lead poisoning, headache, delirium and chronic convulsions, left convergent squint, and loss of vision. Two months later (January, 1875), when he came under observation, he was cachectic, with blue line, characteristic tremors, and severe headache. Urine free from albumen and sugar. No ocular paralysis. V. R = $\frac{15}{70}$ L = $\frac{15}{200}$. Visual fields contracted, especially left. Left pupil dilated, with slow reaction to light. Ophth. L. disc pale, with blurred edges. Arteries small, veins larger, tortuous. Near papilla punctate glancing exudations. Choroidal epithelial changes. R. same in less degree.

Treatment consisted in a seton to the neck, potass-iodid, and sulphur baths. The headache disappeared. V. of R. improved rapidly, of L. more slowly. White lines appeared along the vessels of R. and retinal exudations as in L. After several weeks' treatment R = $\frac{15}{15}$ L = $\frac{15}{100}$.

September, 1879. Patient returned having been under treatment for a myelo-meningitis with paraplegia. He had not returned to the leadworks. V. R = $\frac{20}{70}$ L = fingers at 13′. V. had sunk to this since his recent illness. Concentric narrowing of R. visual field with sector defect below and internally. Corresponding contraction for colours. Ophth. Double neuritic atrophy. Treatment: potass-iodid, and then Arg. Nit.

November, 1883. General health excellent. V. R = $\frac{6}{18}$, L = fingers at 4′. Light perception R. 55° L. over 90°. Both visual fields extremely contracted. Ophth.: complete atrophy.

Case 6.—A labourer, age 31, engaged for one year in a white lead factory, was seized with headache, vomiting, and loss of vision; latterly rapid. When seen half a year later he had a cachectic appearance with blue line and tremor. His urine was normal. Ophth. R. disc, pale, swollen, with blurred edges. Arteries thin with perivascular sheaths. Veins large. Small glancing points round macula. L., the same. V. R = perception of light, L fingers at $\frac{1}{2}$′.

Treatment—L. Heurteloup. R. strychnine injections with potass-iodid internally. The vision of the left eye improved to fingers at 5′ and remained at this. Rotatory nystagmus developed on fixation. The left visual field was extremely contracted. Ophth., double greenish grey atrophy.

These two cases belong to the form of lead amblyopia most frequently observed. Of thirty-four cases collected by Stood, one half were cases of optic atrophy or neuritis. There is rarely swelling, and if present it is but slight. The comparitive good result in Case 5 is very unusual. The cases recorded by Hutchinson (Ophth. Hosp. Reports, 1873, p. 6.) show that retention of what vision remains is the best that can be expected. Even slight improvement in neuritic cases will depend on treatment being early. Whether in the first case the myelo-meningitis was also from lead and caused the subsequent loss of vision could not be decided. The rotatory nystagmus in the second case was most probably due to the great narrowing of the visual field.

A much more hopeful prognosis can be given in cases where the amblyopia resembles uræmic amaurosis. In three such cases quoted by Stood (two at least with albuminuria, condition of urine not noted in the third) vision returned in from one to nine days. In one case nothing abnormal was seen ophthalmoscopically, in the others only clouding of the papillæ. One of these cases presented the general symptoms of granular kidney, and Stood considers himself justified in supposing in all three a dropsical distension of the optic sheath, such as Traube believes to be present in uræmic amaurosis; the consequent œdema of the disc not taking place in the one case because of its short duration (12 hours). Other cases, not albuminuric, quoted by Stood seem to justify the assumption of an acute retrobulbar neuritis.

In a small proportion of cases lead poisoning causes amblyopia secondarily by inducing granular atrophy of the kidneys, and consequent retinitis albuminurica, so that the optic neuritis of lead disease according to Stood may be either a primary neuritis sometimes peripheral, as in his first four cases, sometimes less localized, or a secondary neuritis due to renal disease. Between these as a connecting link he would place the cases of hydrops of the optic sheaths.

THEODORE VON SCHRŒDER (St. Petersburg). On Amblyopia Saturnina. *Von Græfe's Arch., XXXI., I., p.* 229.

Von Schrœder gives a full list of the literature of this subject, and relates the following case, with a discussion upon it. A japanner, thirty-three years old, was brought to hospital in January, 1884, having suffered for one year with weakness and tremor of his hands, especially the right, and for two months with loss of vision and diplopia. His work consisted in painting tin boxes with white lead paint, and subsequently japanning them with lead varnish. How long he had been engaged in this work was not ascertained. He suffered from headache, giddiness, and tinnitus, and had a broad lead line. There was considerable muscular atrophy, with reaction of degeneration in the extensors and interossei of both upper extremities, but especially the right. The supinator longus had as usual escaped.

Examination of the eyes showed marked anæmia of the conjunctivæ and paralysis of both external recti. To the ophthalmoscope the media were clear, and in each eye there was neuroretinitis with moderate papillary swelling and but slight retinal implication. The swelling was greater on the left side, and on the edge of the disc were several small hæmorrhages. On the right side these last were quite isolated. There was perivasculitis, but no extensive exudation. V = 0·6. Under inunctions and the internal use of iodide of potassium the patient rapidly regained power over his extensor muscles and his external recti, the diplopia disappearing in ten days, and the papillary swelling much diminishing. The patient developed an apical pneumonia, but notwithstanding left the hospital twenty-five days after admission very greatly improved. Eleven days later he presented himself with V = 0·8, normal visual field and ocular excursions, but deficient colour vision for red and green. Ophthalmoscopically there was only the merest remnant of the neuro-retinitis.

From the small proportion of cases occurring in this trade von Schrœder supposes that this man must have been specially slovenly in his habits. Among his collected cases of lead amblyopia he finds that white lead workers furnish twelve, artists ten, and house painters nine, none of the other crafts showing more than two each. Of fifty-eight cases, forty-six were male, twelve female, due no doubt partly to the fact that far more males than females are employed in lead works. An unusual point in the case was the papillary swelling and hæmorrhages, but neither in the nature of the lead industry nor in the length of exposure could von Schrœder find any explanation as to the varieties of ophthalmoscopic conditions. Strabismus is a comparatively rare incident in lead amblyopia, but von Schrœder quotes five cases in which a history of diplopia and squinting was given. He inclines to attribute the double abducens paralysis in his case to a central lesion.

The result of treatment was most satisfactory, and von Schrœder would recommend the inunction and potassium iodide treatment in all cases of marked neuro-retinitis, energetically applied in the knowledge that such a condition untreated leads rapidly to atrophy, in which little can be done. Heurteloup has been applied with advantage, and in one case Hirschberg accomplished a cure in a few hours by the use of pilocarpin.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

Thursday, November 12th, 1885.

Jonathan Hutchinson, F.R.S., President, in the Chair.

[Reported by Dawson Williams, M.D.]

Partial Ophthalmoplegia Interna and Externa.—Dr. Seymour Sharkey showed a man, aged 37, who had had tabes dorsalis for three or four years. There were ataxy without paralysis, loss of knee-jerk, and some loss of sensation in the legs. The optic discs were normal; there was practically no ptosis. The left eye retained a fair degree of downward movement, and some downwards and outwards. There was no movement in other directions. The right eye had a fair degree of movement inwards, inwards and upwards, and downwards, but hardly any outwards, or downwards and outwards. The left pupil measured 4·5 millimetres, the right 4 millimetres, but neither acted to light or to accommodation. A slight transient diplopia was noticed by the patient when any sudden movement was made. Vision was $\frac{6}{12}$ in both eyes; hypermetropia; perfect vision for colours. No history of syphilis; but, as in other cases, a history of acute rheumatism twelve years earlier.

Retinal Detachment.—Dr. W. A. Brailey showed a case of retinal detachment, which resembled a sarcoma of the choroid. The man, fourteen years ago, whilst in a stooping posture in a tunnel, felt that something had happened to his eyesight, and on coming into the light, the corresponding half of each field of vision was found to be blind. Owing to the presence of iritis in the left eye, the fundus on that side could not be properly examined. A large iridectomy was made upwards, and subsequently the field of vision and acuity had improved. French observers had noted great improvement after iridectomy in cases of detachment of the retina. The hemiopia was noticed as soon as the man left the tunnel; the iritis apparently had no relation to the hemiopia.

Scissors for Intra-ocular Operations.—Mr. Brudenell Carter showed a pair of scissors specially made for the division of capsular bands or iris after cataract-extraction. They are made in two sizes by Messrs. Weiss and Son.

Lid-Irrigator.—Mr. J. B. Story showed an instrument for irrigating the lids in severe ophthalmia. It consisted of a length of fine india-rubber tubing, perforated and stiffened with wire where introduced beneath the eyelids.

Aneurysms of Retinal Vessels.—Mr. J. B. Story showed a young man who presented aneurysms of the retinal vessels. A drawing of the retinal vessels, by Mr. A. H. Benson, was exhibited to the Society in 1883, and published in the Society's "Transactions." At the present time, it was possible to see five or six aneurysms scattered about the fundus of the eye, some connected with arteries, others with veins. They did not now exactly correspond with those observed at the time when the drawing was made.

Neuro-retinitis of Doubtful Origin.—Mr. Henry Power showed a severe case of retinitis in a boy, who had also paralysis of the left sixth nerve. There had been some headache, slight nausea, and constipation. There was no albuminuria and no evidence of syphilis, but some history of rheumatism, and a systolic *bruit* at the left apex of the heart. Possibly a cerebral tumour was the cause, but it was curious that no further symptoms were present.

Dr. Angel Money said the boy's voice was nasal, and the knee-jerks could not be readily got, if at all. The boy said his throat had been sore. Was there any reason to suspect a postdiphtherial disease?

Mr. Brudenell Carter enquired how long the boy had been under observation. He related a curious case of identification in a man whose body was found in the ruins of the Boston theatre after the fire, and who, it turned out, had had optic neuritis three years before his death: a necropsy showed a cerebellar tumour.

Mr. Power said there was no albuminuria: diphtheria might have been present, but there was no definite history of it. The boy had been under observation since October 23rd.

Pemphigus of Conjunctiva.—Mr. Lang read a paper on pemphigus of the conjunctiva. Mr. White Cooper recorded the first case of this disease in Vol. I. of the Royal London Ophthalmic Hospital Reports, in 1858. No other case had been published in England. Campbell, in America, had described one. The remaining twenty cases had been described by Continental writers. Stellwag, in 1870, described a disease called "Syndesmitis degenerativa." Von Graefe, in his Archives for 1878, described the same disease as "Essentielle Schrumpfung der Bindehaut." Steffan has also written on the subject. The first case of Mr. Lang's was a woman, aged 52, who had been subject to ulcerated sore-throat since childhood. In the spring of 1883, the white of the eye became red, the lids drooped, and there was a discharge, accompanied by pain and heat. The case was described in the Ophthalmological Society's "Transactions," Vol. IV., p. 20. For the last seven months the disease had remained stationary. The right palpebral fissure was much shorter and narrower than normal, both lids being completely adherent to the globe. The eyelashes were unaltered. The conjunctiva was replaced by a dry, black, opaque membrane. At only one point was the cornea moist and transparent. The left eye was in much the same condition. The globes were almost motionless, but the lids could be completely closed. The mouth and throat were normal, except for a small round grey patch on the soft palate. The second case was that of a young woman, aged 24. In the spring of 1871, the left cervical glands began to enlarge. In 1876, the ends of the fingers gathered, and blisters came on the backs of the hands and the front of the body; since then, she had never been free from this eruption. The same year, the eyelashes turned in, and the whites of the eyes became red. A vigorous shake of the hand would produce a blister. The condition had not altered during the last three years. There were several thin large scars in the neck, and the palms of the hands and fingers were smooth, thick, and contracted. The toes were in the same condition. The backs of the hands were in the same scarred condition. The mucous membrane of the lips, mouth, and tongue was considerably altered. There were vesicles, filled with clear yellow fluid, on the left side of the tongue. Three years ago Mr. Adams performed Burow's operation for inverted lashes.

The President had never met with a case in which xerophthalmia was associated with pemphigus, nor had he seen pemphigus of the conjunctiva.

Mr Adams Frost said there was a case of xerophthalmia of one eye only at St. George's Hospital last year, which closely resembled the cases described by Mr. Lang, but no pemphigus occurred on the body. Transplantation of rabbit's conjunctiva had improved the vision.

Mr. Lang remarked that in Germany transplantation had been performed several times with some advantage, but the improvement was of very short duration.

Mr. Nettleship said that a case, apparently of this class, had recently been under his care at St. Thomas's Hospital. The patient was a man about fifty, who had previously been under the care of Dr. Semon for an unusual affection of the nose and throat, which, he complained, was frequently obstructed by scabs, which from time to time came away, leaving the nasal mucous membrane sore and raw. When first seen by Mr. Nettleship, the right eye was in a condition which was diagnosed as chronic muco-purulent conjunctivitis; contraction and partial obliteration of the conjunctival sac had occurred; on a few occasions, one or two aphthous-looking patches, such as might have been left by bullæ, had been seen. The man had not had any bullous eruption, but had had syphilis, and presented a serpiginous eruption of the palms.

Mr. Juler asked on what grounds Mr. Lang classed his second case as one of pemphigus, as the cutaneous lesions were so slight. In his case, thickening of the conjunctivæ and lids, with shrinking, was present, but there was no evidence of pemphigus on the skin.

Mr. Lang, in reply, said the woman had had bullæ on the pharyngeal mucous membrane. He had seen two other cases; one was in a man, aged seventy; the eyelids were thin, and the cornea seemed to be covered by a thin skin; in the other, there was general pemphigus, and a bulla formed over the cornea, which sloughed, and the iris prolapsed; there was no shrinking of the conjunctiva.

Pupillary Movements Associated with Extrinsic Movements. — Mr. W. H. Jessop showed a man, aged thirty-three, who, when fourteen years old, was admitted into the Great Northern Hospital with fracture of the skull; a depression in the skull, the result of this injury, was still apparent. For the last ten years he had suffered from gout, probably connected with his occupation (painter). Four years ago left hemiplegia, and the face paralysed; no affection of eyelids; no wrist-drop or perversion of reflexes. With all movements of the eyeball with which the external rectus was associated, the pupil dilated to 7·5 millimetres, while, with all movements inwards, the pupil contracted to 3·5 millimetres; this was the case with both eyes. On convergence and accommodation, the pupils contracted to 3 millimetres. The pupils did not react to light or to sensory irritation; the contraction of the pupil occurred much more quickly than the dilatation. When the external rectus was in action, the dilatation was like that produced by sympathetic irritation; when the movement was inwards, the contraction was like that produced by stimulation of the third nerve. The loss of light-reflex and of sensory reflex, combined with good action on accommodation and good conjugate deviation, rendered it probable that the lesion was in the nervous path beneath the aqueduct of Sylvius, and below the anterior part of the corpora quadrigemina.

Dr. Beevor thought the lesion was situate towards the posterior third of the posterior segment of the internal capsule, as there had been hemianæsthesia. He had not seen the phenomenon in locomotor ataxy.

Dr. Ormerod said that we ought to expect a similar condition in cases of locomotor ataxy.

Mr. Lang referred to an observation of Mauthner on ophthalmoplegia externa, in which the pupil dilated when the patient looked outwards. In a case of paralysis of the left external rectus, which he himself had seen, the pupil dilated when the patient looked to the right.

Mr. Marcus Gunn had noticed in some cases of paralysis of the sixth nerve that the pupil dilated on attempts to look in the direction of action of the paralysed muscle.

Mr. Jessop, in reply, said that he had not examined many cases of locomotor ataxy in this regard, but the existence of a contracted pupil might obscure the condition.

Dangers of Cocaine.—Mr. Nettleship asked whether, in the experience of members of the Society, the gelatine-discs of cocaine were not satisfactory? His suspicions had been raised by the occurrence of a serious run of cases of panophthalmitis at St. Thomas's Hospital, while, at the same time, the cases at Moorfields did well. At St. Thomas's Hospital, he had been using gelatine-discs of cocaine before iridectomy and cataract. Messrs. Savory and Moore had informed him that, since cocaine was hygroscopic, the gelatine discs were always moist, and that it was impossible to keep them thoroughly dry; he suggested that the discs might afford a breeding ground for pathogenic organisms. Solutions of cocaine also apparently had a tendency to cause panophthalmitis. Graefe had found chronic interstitial keratitis much more common since he had used cocaine.

Mr. M. McHardy had also, at one time, had a run of panophthalmitis after using solutions of cocaine. Fifteen days appeared to be the longest time which it was safe to keep a solution of cocaine; since using quite fresh solutions (eight per cent.) he had had no bad cases.

Mr. Edgar Browne had also recently had an unfortunate series of cases, and was inclined to suspect that cocaine was responsible for that misfortune.

Mr. Story said that solutions of cocaine might be made up with boracic acid. He found it difficult to understand why solutions of cocaine should be so dangerous, while atropine solutions had been used for many years without mischance. Epidemics of panophthalmitis had occurred from time to time before the introduction of cocaine.

Mr. Marcus Gunn suggested that these epidemics might be due to the atropine solutions, which also afforded a breeding ground for germs.

Mr. Lang mentioned a case of panophthalmitis which he had recently encountered, where the only cause that could be suggested was that the solution of cocaine was not fresh.

Mr. Nettleship said that, at Moorfields, the solutions of cocaine were made up with saturated solution of boracic acid. He had never before had so severe a run of cases in his own practice.

Deep-Seated Foreign Bodies, with Preservation of Sight.—Mr. Simeon Snell referred to three cases of pieces of steel in the retina. One was recorded in the R. L. Ophth. Hosp. Reports for 1879; sight remained perfect, when the young man was lost sight of, many months after the accident. The fragment lay in the retina near the disc, and had passed through the sclerotic. The second was in a man, aged 42; the chip passed through cornea and lens, lodging in the retina, near the periphery; for some time vision was excellent, cataract then formed, underwent absorption, and good vision returned. At the end of five years, the eye remained quiet so far as the foreign body was concerned. In the third case, the chip penetrated the sclera, just external to the cornea, and lodged in the outer and lower part of the retina. When first seen, vision = $\frac{20}{20}$; the fragment looked black and lustrous, and was surrounded with whitish exudation, as in the other cases. Three months later the situation of the foreign body was obscured by a patch of whitish exudation; and three months later still he came with iritis and great pain; the condition became rapidly worse, and the sclerotic was punctured between the internal and external recti, and the piece removed with the electro-magnet; cataract was developed, but at the present time perception of light was excellent, and so was tension, and with extraction (iridectomy had already been done), sight would, it was hoped, be restored. Mr. Snell discussed the question as to whether or not the chip had left its place in the retina and fallen into the vitreous humour, as he supposed at the time of the operation; no foreign body was, however, at any time clearly seen with the ophthalmoscope in the vitreous humour; the foreign body was coated on one side and not on the other, and the position of the scleral wound brought the chip well within the field of the magnet. He inclined to the view that the piece remained in the retina, and was removed therefrom by the magnet. The fragment weighed four milligrammes. Reference was made to the cases collected by Knapp, thirteen in number, and to other recorded cases. Experience taught how frequently these particles were tolerated in the back of the eye. Generally speaking it appeared that they might be left alone; interference would be fraught with more danger, though Galezowski and Stevens (New York) had each reported a case of removal of a splinter from the retina with a magnet. Mr. Snell also related an instance of a small particle of shell, tolerated, with perfect sight, in the vitreous humour for twelve months; it had passed through the cornea and lens. There was also paralysis of accommodation, the cause of which was not certain; the injury seemed insufficient; the patient and others of the family had not long before suffered from sore throats, but their medical attendant did not allow that it was diphtheria, nor were there any other marked sequelæ.

OPHTHALMOLOGICAL SOCIETY.

November 13th, 1885.

THE BOWMAN LECTURE ON OPHTHALMOLOGY AND DISEASES OF THE NERVOUS SYSTEM.

By J. Hughlings Jackson, M.D., F.R.S.

To give what could with propriety be called an abstract of Dr. Hughlings Jackson's lecture is simply an impossibility, but the following may be taken as indicating the lines of thought followed by him. For a full report we must refer to the weekly journals.

Commencing with an appreciative reference to the basic work of Sir William Bowman, and an expression of personal thanks to Mr. Hutchinson, the President of the Society, Dr. Jackson proceeded:—It was long ago said that division of labour or more generally differentiation is a universal law. To this universal law the body medical is no exception. It has become progressively more complex; alienist physicians, neurologists, obstetric physicians, ophthalmic surgeons, physiologists, chemists, &c., each specialty a differentiated part of a wide general knowledge. Specialists have to justify their differentiation. Now the factors in progressing evolution, according to Spencer, are: increasing (1) differentiation, increasing (2) definiteness, increasing (3) integration, and increasing (4) co-operation. Differentiation without definiteness would be confusion. But under this head both the ophthalmic surgeon and the neurologist have fully justified themselves, on the one hand by the work done in ocular paralyses and in abnormalities of refraction, and on the other hand by such definite work as that of Charcot. Again, in the matter of integration and co-operation, each different definite worker is working for the whole body medical, each different worker helps all the others. The Argyll Robertson pupil-symptom investigated by an ophthalmic surgeon balances the diagnostic value of the loss of knee jerk discovered by Erb and Westphal And again, hypermetropia, suspected by the neurologist as a cause of head troubles, needs the co-operation of the ophthalmic surgeon to correct it.

Taking epileptic paroxysms and their after conditions as an illustration of the morbid nervous affection of greatest complexity of symptoms, Dr. Jackson went on to say:—Epilepsy is a disease of the "organ of mind," that is to say, of the highest and most complex centres. The symptomatology of the paroxysm is probably a universal symptomatology, is demonstrably nearly so. At the climax of a severe fit, we see the algebraical sums of the co-operations and antagonisms of strongly developed movements of all the muscles of animal life accessible to observation—universal convulsion. As to wide involvement of sensory elements in the epileptic discharge, we can say that this is implied by "warnings" of crude and excessive smells, colours, sounds, tastes, by tinglings, &c., of the hands, and by many crude and excessive organic sensations. Of what happens in the sensory sphere after loss of consciousness, we can say nothing. Besides colour development, there is another eye symptom—a vertigo—in which external objects seem to move, implying discharge, direct or indirect, of motor cerebral elements representing ocular movements. We find dilatation of the pupils (perhaps, sometimes contraction); there are great pallor of the face, increased flow of saliva, perspiration, alterations of pulse and respiration, passage of urine and fæces, and erection of the penis.

I do not think I need apologise for speaking in this lecture of the non-ophthalmological symptoms of epileptic paroxysms, especially of those of the organic parts. These symptoms are an important part of the evidence towards showing that the "organ of mind" (highest centres) represents or co-ordinates all parts of the body. These centres are thus the organ of will, memory, reason, and emotion, the four elements of mind, or, equivalently, of consciousness. Unless retinal impressions corresponding to colour of objects, and ocular movements corresponding to shape of objects, are represented in the highest centres, how are we to account for the physical bases of visual ideation? If the organic parts are not represented in the highest centres, an emotional manifestation, say, of fear, is unaccountable.

Whilst a man is thinking, or even dreaming, of a brick, he is having a purely psychical state; the correlative physical state is discharge of some nervous arrangements of his highest centres representing parts of his body—certain retinal impressions and particular ocular movements. Again, when a man is afraid, he is having a purely psychical state; the correlative physical state is discharge of some nervous arrangements of his highest centres representing parts of his body—notably, the organic parts. There are clinical reasons why the ophthalmic surgeon should be interested in symptoms in organic parts. Often enough in other diseases of the cerebrum does he see effects produced in organic parts. To say nothing of vomiting, so common with optic neuritis from cerebral tumour, there are acute stages in such cases, in which there are alterations of pulse and respiration, retracted belly, and constipation. Consider also the migrainous paroxysm, which is no doubt owing to a cortical discharge, so often beginning by elaborate visual projections, and so often ending by vomiting. Eye-symptoms from disease of the cerebrum cannot, in many cases, be studied isolatedly from organic symptoms. We have not yet done with the complexity of the epileptic paroxysm.

We must note movements of chewing or tasting, swallowing, vomiting, and writhing movements of the arms during arrest of respiration. I do not believe that these movements result directly from the epileptic discharge, holding that such a discharge, so far as it spreads, puts an end to all movements properly so called, "runs them up" into convulsion. I suggest that an important eye-symptom at, or near to, the onset of some epileptic fits, the apparent alteration in size or distance of external objects, is, on the physical side, a phenomenon of the same order as the chewing movements, that both are the indirect (reflex) results of epileptic discharges of sensory elements. Ferrier produced, by faradising a monkey's "taste-centre," movements like the chewing and tasting movements some epileptics or their friends describe. It is exceedingly important to distinguish movements proper from convulsion, which is a contention of many movements. I suppose everyone would believe that spitting, rubbing one hand with the other, clutching at the throat (in rapid suffocation?), are movements too elaborate to result from such a discharge as that which produces convulsion.

Now for the mental symptoms of, or rather during, the discharge beginning in part of the "organ of mind." During the epileptic discharge there is defect or cessation of consciousness. Some think that also during it, at the outset of the fit, there arise the exactly opposite mental states of "overconsciousness," "dreamy state," alterations in size and distance of external objects, "seeing faces," and "hearing voices." I believe that these superpositive mental states arise during slightly raised discharges of healthy nervous arrangements untouched by the epileptic discharge.

Regarding the different associations of different sense warnings in epilepsies, I believe that the "subjective" sensations—smell, taste (or chewing, &c., movements), and the "epigastric" sensation—most often occur in those cases of epilepsy in which there is the "dreamy state," and that the cortical lesions in these epilepsies are in parts of the cortex in the region of the posterior cerebral artery, which vessel supplies, among other parts Ferrier's centres for smell and taste. Again, some cases of epilepsy, with colour and sound warnings (with which I have never known the "dreamy state" to be associated), are owing, I believe, to cortical disease in some part of the region of the middle cerebral artery, which vessel supplies among other parts, Ferrier's centres for sight and hearing. I consider that the nervous changes (the "discharging lesion") in epilepsies are not primarily, but only secondarily, nervous; that in most cases they are secondary to embolism or thrombosis of small arterial branches.

In certain cases of epilepsy complicated with eye symptoms pointing to intra-cranial tumour, the investigation of the ophthalmic surgeon is particularly desirable. A man had occasionally smells in his nose, heralding in slight attacks of epilepsy, with the "dreamy state;" there were left-sided "shakings" in the paroxysms. There was double optic neuritis but no defect of sight; the neuritis passed off under mercurial inunction and iodides; sight remaining good. The patient died apoplectic, with left hemiplegia. His case illustrates the dictum that a man with optic neuritis is to be considered as being in imminent danger of death; that this patient was in any such danger no one could have surmised who did not find out that there was optic neuritis. The slighter the paroxysm in such cases the more necessary, both for the patient's sake and for medical science, is its minute investigation. That optic neuritis is often overlooked in its præ-amaurotic, most curable stage, is certain. Another case of this kind of epilepsy (bitter taste, "dreamy state," and right-sided numbness), investigated by Dr. James Anderson, was complicated by simple atrophy of the optic nerves. There was loss of sight of the left eye, of the right field of the right eye, almost loss of smell on the left side, defect of taste more on the left side. The paroxysmal one-sided numbness was right-sided, and the patient was not left-handed; in most such cases the one-sided phenomena, if any, are left-sided. A case similar to this in its optic symptoms has been recorded by Mr. Nettleship (Transactions Ophth. Soc., Vol. IV., p. 285), and I believe that in Dr. Anderson's case, as in Mr. Nettleship's, there is a basal tumour involving the left-middle cerebal lobe.

Speaking now of the after conditions of epileptic paroxysms very generally, we have insanity, according to the severity of the fits, in two degrees at least—in three, I think. There is so-called "loss" of consciousness with actions (postepileptic "unconsciousness" with mania, for example), and after very severe paroxysms, acute dementia (coma).

There is one after-effect which is certainly paralytic—transitory lateral deviation of the eyes, observed by Beevor instantly after severe attacks. Again, the exaggerated knee-jerks and foot-clonus after some fits (Beevor) imply paralysis, signify exhaustion of fibres in the lateral columns, and possibly also of inhibitory centres in the cord itself (Gowers). Here we have after-effects of the two extremes—eyes (paralytic), feet (implying some paralysis); it would be remarkable if the rest of the symptoms were not paralytic.

I submit that it would not be possible for a neurologist to scientifically study this exceedingly complex disease without availing himself of the work done by different specialists. We require many different kinds of definite or technical knowledge; all the sagacity in the world will not avail, either for practical ends or for the scientific investigation of complex problems, without technical knowledge. No one man can have, from his own working, enough different definite knowledge to thoroughly investigate the universal symptomatology of epilepsy.

To the ophthalmic surgeon the neurologist is very directly indebted in his investigation of epilepsy. Here I will pick the eye-symptoms out of the heap.

Sometimes, but yet very rarely, we have optic neuritis (common in epileptiform seizures), or simple optic atrophy as I have illustrated. To speak only of the paroxysm, in some cases there are colour warnings, occasionally followed by the greatly more elaborate mental state, "seeing faces." There are pupillary affections. In one case of uræmic convulsions I saw the fundus easily during the fits, but could get no glimpse of it in the intervals. We have vertigo at the onset of some paroxysms. Vertigo is consciousness ceasing; that variety of it in which objects seem to move to one side is an eye-symptom; it implies discharge, primary or secondary, of centres representing particularly the most special of ocular movements. If we have not clear ideas on vertigo in epilepsy, we shall work sad havoc in the investigation of some important varieties of epilepsy. Here the neurologist should avail himself of the definite knowledge the ophthalmic surgeon can give him from cases of paralyses of ocular muscles, in which vertigo is seen in its simplest form, before he studies it in the vastly complex circumstances of the epileptic paroxysm.

There is another important eye-symptom in epilepsy: apparent alteration in the size and distance of objects. It occurs, I think, most often in those epileptic attacks in which there is the "dreamy" state. It is physically a "motor affair;" that size and shape are not simply "retinal affairs" is easily proven. Here we avail ourselves of the definite knowledge of the ophthalmic surgeon (the micropia after instillation of atropine; in paralysis of an internal rectus; the opposite condition after eserine). But we must not apply the knowledge derived from such simple cases to alterations in size of external objects at the onset of epileptic fits without great caution, the situation being an exceedingly complicated one. I have already stated an hypothesis regarding the mode of production of these phenomena. Dr. Gowers has considered them, with his characteristic ability, in his valuable work "On Epilepsy," page 64, a work rich in ophthalmological knowledge.

In inquiring into the constitution of the "organ of mind" we should follow the method of science, and investigate by the use of hypotheses This may seem a strange remark to those who erroneously suppose an hypothesis to be a conclusion in which we may rest. It is only used for the methodising of work by observation and experiment. I submit that we should adopt the hypothesis of evolution, according to which the whole nervous system is a sensori-motor system representing all parts of the body. I suggest that all parts of the body are represented in each of three levels of evolution (representative, re-representative, and re-re-representative). Strictly, we should speak of four levels, as, in tracing the "ascent" (*vide infra*) from eye-muscles to most complex ocular movements, we should begin at the periphery. Representation increases in (1) differentiation (complexity), (2) definiteness (speciality), (3) integration (intricacy), and (4) in number of interconnections (co-operation) from lowest centres to highest centres ("organ of mind"). The "organ of mind" is nothing else than a series of centres representing, or, what is the same thing, co-ordinating, all parts of the body "from eyes to feet" in greatest complexity, &c. Each highest centre represents all parts or wide regions of the body ; no two represent all parts, or the same parts, in the same way. The evolutionist does not attempt the marvellous feat of "getting the mind out of the body ;" he only tries "to get" the physical bases of mind (highest centres) out of the rest of the body. Mental states are only concomitant with nervous states.

Taking an ophthalmological illustration, and yet artificially simplifying it by considering only the first factor in evolution, we might try to trace an ascending complexity of representation from the nerve supply to ocular muscles up to representation of ocular muscles in exceedingly complex movements in the physical bases of visual ideas and other mental states. We should use the "experiments" which disease makes (dissolutions) in endeavouring to trace that ascent. 1, Paralyses of ocular muscles from lesions of their nerve-trunks (periphery) ; 2, Ophthalmoplegia externa and interna (lowest motor centres); 3, Lateral deviations of the eyes in lesions, negative and positive, of the middle motor centres, or of a plexus (internal capsule) just below them (Vulpian and Prevost). In some limited epileptiform seizures we see development of movements of the eyes in very important associations. Possibly the interesting and remarkable paralyses of particular ocular movements which Priestley Smith has described are monoplegias, owing to negative lesions of some middle centres ; 4, Deviations of the eyes in and after epileptic fits, which are, I presume, developments and losses of the most complex movements which are represented in the physical bases of visual ideas and other mental states. These "experiments" are very rough, but some of them can be supplemented by the very definite experiments, properly so called, of Hitzig and Ferrier. I refer here to the proof which Ferrier and Gerald Yeo have given of the representation of ocular movements, or of the most special of them, in the frontal lobes ; these parts of the "organ of mind" I call highest motor centres.

To guard ourselves against vagueness through this wide way of studying diseases, we must at the same time, while working at this disease of the highest level of evolution, also work at different diseases of, for example, the lowest level. In different progressive muscular atrophies we have symptoms nearly, if not quite, all along the lowest level, from ophthalmoplegia externa downwards.

Here is an important ophthalmological matter. It is well known that, with destructive lesions of the brachial plexus, we have smallness of the pupil on the side of the injury. Ferrier finds that, in the monkey, and presumably it is as in man, the dilator fibres of the iris, contained in the cervical sympathetic, are derived from the anterior root of the second dorsal nerve. In the monkey, the second dorsal sends a communicating branch to the brachial plexus, and so it does in most cases in man (Cunningham). Now the second dorsal root (Ferrier) supplies also the intrinsic muscles of the hand. In one case I have observed a small pupil (inability to dilate when shaded) in a case of progressive muscular atrophy, at a stage when the hand muscles were almost solely atrophic. Here again the neurologist has common ground with the opthalmic surgeon.

I submit quite hypothetically that we have atrophies of cells of centres for organic parts, like the atrophy of cells of anterior horns and their higher homologues, which produce progressive muscular atrophies. This for example in pernicious diabetes, in Graves' disease, in myxœdema.

In tabes dorsalis and diphtherial paralysis we have, taking numerous cases, symptoms " all along the line from eyes to feet," both implicating also organic parts, gastric crises and bladder troubles in the first, death after slowing of the pulse in the second. The ophthalmic surgeon sees eye-symptoms from lesions at or near to the "top" of the lowest level of evolution. Having great integration of medical knowledge of other kinds, he does not regard them as eye-disease only, but finds what they mean, what wide symptomatology they are important elements of. By co-operation of many different workers, each with definite or special knowledge of particular kinds, and each with great integration of more general knowledge, we may hope to thoroughly analyse these very complex symptomatologies.

Thus the neurologist, by availing himself of the different definite work which ophthalmic surgeons, aural surgeons, laryngologists, &c., are doing at different points all along the (1) lowest level of evolution, by working himself at different diseases on the (2) middle level (epileptiform seizures, monoplegias, migraine, &c.), by working with the alienist physician at diseases of the (3) highest centres (epilepsies and insanities) may hope to justify his differentiation. The several workers may hope to add (1) different (2) definite knowledge to, and further the (3) integration of general medical knowledge, and to lead to a higher and more methodical (4) co-operation of different workers. I say once more that this wide comparative study cannot be methodically undertaken, if we confuse psychology with the anatomy and physiology of the nervous system—not if we take the organ of mind to be mind. The "organ of mind" is simply a series of centres re-re-representing impressions and movements of all parts, literally all parts, of the body.

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